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UK METEOROLOGICAL OFFICE GLOBAL DATA MONITORING REPORT

November, 93

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1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis. The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background field). Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

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2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1-2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIBU observations received per day throughout the month at Bracknell and assimilated into model runs. Only data from the main hours of 00 UTC, 06 UTC, 12 UTC and 18 UTC are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Aircraft observations

TABLE 3 contains a list of statistics calculated from data received from all airline carriers.

Figure 3 shows 10 degree lat/long box average numbers of AIREP/ASDAR reports received per day throughout the month at Bracknell and assimilated into model runs in the layer 70-500 hPa. Observations with a vector wind difference (compared with the model background field) of >60 m s^{-1} have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4-7 show wind statistics for AIREP/ASDAR in the layer 70-500 hPa. Observations with a vector wind difference > 60 m s^{-1} have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure	Parameter
4	Mean wind vectors
5	Mean observation - background wind vector
6	Mean observation-background speed (m s^{-1})
7	RMS observation-background vector (m s^{-1})

Radiosonde Observations

TABLES 4-6 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 4 and 5 and the weights used in the RMS values in TABLE 4.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-27 show satellite mean observation-background temperature differences for NOAA-11 soundings at 500 km resolution and figures 28-30 show the same statistics for NOAA-12. Data are plotted where there are > 30 observations in a 10 degree lat/long box.

Figure	Layer (hPa)
25/28	850-1000
26/29	100-300
27/30	30-50

TABLE 1

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH:November, 93

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for ships, fixed buoys and platforms.

Standard of comparison :Background field from Bracknell global model.

Observation times :00, 06, 12, 18 UTC

Elements monitored
:Mean sea level pressure (hPa).
:Wind speed ($m\ s^{-1}$).
:Wind direction (Degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors. **N.B. a positive bias indicates the observation is veered to the background.**

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT
:15 hPa (pressure)
:25 $m\ s^{-1}$ (vector wind)

SELECTION CRITERIA :NOBS ≥ 20 ,and one or more of the following:

1. |bias| ≥ 4 hPa (pressure),
   ≥ 5 $m\ s^{-1}$ (wind speed)
   ≥ 30 degrees (direction).

2. SD ≥ 6 hPa (pressure)
   ≥ 80 degrees (direction).

3. PGE ≥ 25.

IDENTIFIER	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA-LEVEL PRESSURE									
CFD3659	ALL	MSLP	SUR	88	2	2	4.0	5.6	6.8
CG2844	ALL	MSLP	SUR	29	0	0	1.8	5.0	5.3
C6BT8	ALL	MSLP	SUR	37	1	3	2.3	5.0	5.5
C6QK	ALL	MSLP	SUR	34	3	9	3.4	-5.1	6.1
DZSB	ALL	MSLP	SUR	38	0	0	1.2	-4.1	4.3
ESBI	ALL	MSLP	SUR	36	0	0	2.0	6.3	6.6
FNVA	ALL	MSLP	SUR	34	1	3	2.0	-5.4	5.7
OU2465	ALL	MSLP	SUR	38	0	0	1.8	-4.2	4.6
UGPA	ALL	MSLP	SUR	26	2	8	6.0	6.5	8.8
UHVW	ALL	MSLP	SUR	22	0	0	1.5	4.4	4.7
UJFY	ALL	MSLP	SUR	37	0	0	1.9	-4.3	4.7
USZQ	ALL	MSLP	SUR	24	1	4	2.6	-4.7	5.4
UUJV	ALL	MSLP	SUR	63	4	6	2.1	-6.1	6.5
VOCG	ALL	MSLP	SUR	24	8	33	4.0	-4.3	5.8
VTCN	ALL	MSLP	SUR	23	1	4	1.8	4.2	4.6
WCZB	ALL	MSLP	SUR	32	0	0	0.9	7.6	7.6
WC5932	ALL	MSLP	SUR	53	0	0	3.5	-4.1	5.4
WE3806	ALL	MSLP	SUR	51	1	2	2.6	-4.9	5.6
WE4805	ALL	MSLP	SUR	25	25	100	0.0	0.0	0.0
WE4879	ALL	MSLP	SUR	50	1	2	1.5	-4.2	4.5
WSB2018	ALL	MSLP	SUR	21	0	0	3.2	-4.7	5.7
WZE4928	ALL	MSLP	SUR	51	48	94	8.2	7.6	11.2
17001	ALL	MSLP	SUR	27	20	74	10.4	2.7	10.8
3EAY5	ALL	MSLP	SUR	24	0	0	0.9	-4.5	4.6
3FGH3	ALL	MSLP	SUR	26	0	0	1.2	-4.0	4.2
3FJJ3	ALL	MSLP	SUR	22	1	5	1.5	-11.1	11.2
3FLS2	ALL	MSLP	SUR	30	0	0	1.8	-5.1	5.4
WIND SPEED									
D5BC	ALL	SPEED	SUR	37	0	0	5.2	5.2	7.3
ELDU4	ALL	SPEED	SUR	49	0	0	3.0	6.2	6.9
ELGI5	ALL	SPEED	SUR	27	0	0	3.8	5.1	6.4
JBCN	ALL	SPEED	SUR	29	0	0	2.6	5.0	5.7
J8PC	ALL	SPEED	SUR	26	0	0	2.9	5.0	5.8
KDDW	ALL	SPEED	SUR	24	0	0	4.6	6.8	8.2
P3LE5	ALL	SPEED	SUR	28	0	0	2.1	-7.6	7.9
UINM	ALL	SPEED	SUR	23	0	0	4.1	5.0	6.5
UTNT	ALL	SPEED	SUR	45	0	0	3.8	-6.8	7.8
VMAL	ALL	SPEED	SUR	28	0	0	5.4	5.8	7.9
ZBWE	ALL	SPEED	SUR	39	1	3	5.4	6.1	8.1
3FCN3	ALL	SPEED	SUR	31	1	3	6.3	10.8	12.5
WIND DIRECTION									
CG2614	ALL	DIRN.	SUR	46	0	0	35.1	34.7	49.4
DUPV	ALL	DIRN.	SUR	24	0	0	24.3	31.8	40.0
UGPA	ALL	DIRN.	SUR	22	0	0	74.2	75.4	105.8
46027	ALL	DIRN.	SUR	49	0	0	47.2	-31.4	56.7
46051	ALL	DIRN.	SUR	21	0	0	48.5	-50.4	69.9
46053	ALL	DIRN.	SUR	48	0	0	57.6	-41.0	70.7
46054	ALL	DIRN.	SUR	53	0	0	41.2	-30.4	51.2
46131	ALL	DIRN.	SUR	54	0	0	59.9	-50.6	78.4
46146	ALL	DIRN.	SUR	43	0	0	81.1	-23.9	84.5
46147	ALL	DIRN.	SUR	95	0	0	27.1	-34.9	44.2
46181	ALL	DIRN.	SUR	59	0	0	56.3	-52.3	76.9
46183	ALL	DIRN.	SUR	91	0	0	26.9	-30.3	40.5

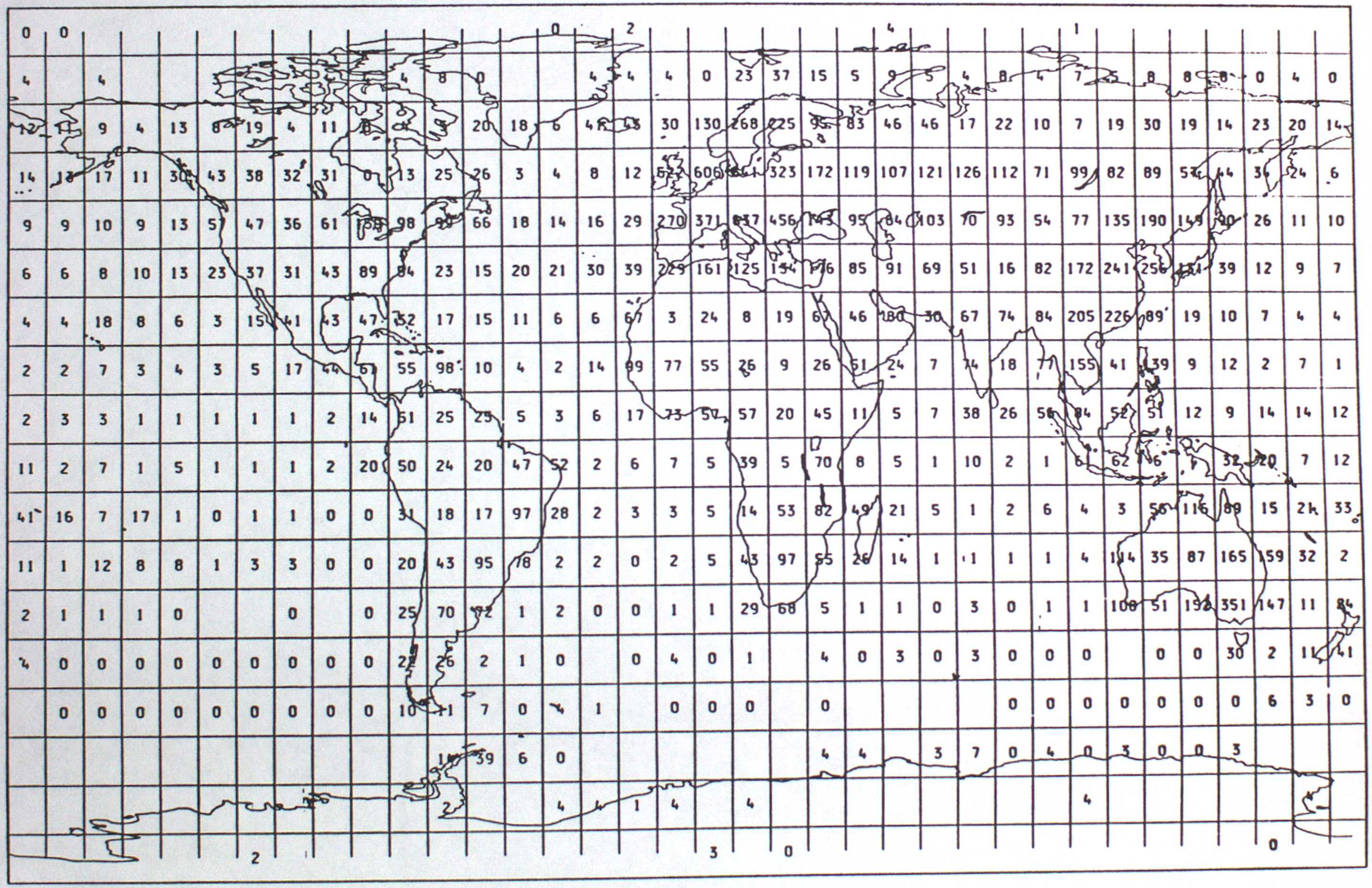
AVAILABILITY - SHIP/SYNOP - NOVEMBER 1993

FIGURE 1

MAIN HOURS ONLY

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

TOTAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 19095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9 9 10 9 13 57 47 36 61 158 98 93 66 18 14 16 29 270 371 837 456 143 95 84 103 70 93 54 77 135 190 149 90 26 11 10
6 6 8 10 13 23 37 31 43 89 84 23 15 20 21 30 39 229 161 125 154 176 85 91 69 51 16 82 172 241 256 131 39 12 9 7
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2 4 4 1 4 4 4
2 3 0 0

TABLE 2

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH:November, 93

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for drifting buoys.

Standard of comparison :Background field from Bracknell global model.

Position :Average Latitude and Longitude for period.

Observation times :00, 06, 12, 18 UTC

Elements monitored :Mean sea level pressure (hPa)
:Wind speed ($m\ s^{-1}$),
:Wind direction (degrees).

Parameters monitored :NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)
:25 $m\ s^{-1}$ (vector wind)

SELECTION CRITERIA :NOBS ≥ 20 ,and one or more of the following:

1. |bias| ≥ 4 hPa (pressure).
≥ 5 $m\ s^{-1}$ (wind speed).
≥ 30 degrees (direction).

2. SD ≥ 6 hPa (pressure).
≥ 80 degrees (direction).

3. PGE ≥ 25.

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA-LEVEL PRESSURE											
12501	40.1	10.8	ALL	MSLP	SUR	249	249	100	0.0	0.0	0.0
17584	-37.7	21.6	ALL	MSLP	SUR	263	231	88	2.0	10.6	10.7
44614	56.3	-41.8	ALL	MSLP	SUR	952	171	18	6.3	3.3	7.1
44624	56.0	-44.3	ALL	MSLP	SUR	81	2	2	6.6	-0.3	6.6
46664	45.8	-161.6	ALL	MSLP	SUR	42	11	26	4.5	4.3	6.2
65596	65.3	-31.1	ALL	MSLP	SUR	93	90	97	0.6	10.6	10.6
71003	-2.1	8.8	ALL	MSLP	SUR	627	627	100	0.0	0.0	0.0
74002	-1.8	8.8	ALL	MSLP	SUR	526	106	20	4.1	-8.3	9.3
WIND SPEED											
44513	59.7	-36.1	ALL	SPEED	SUR	270	0	0	3.7	-6.9	7.8
44614	56.3	-41.8	ALL	SPEED	SUR	390	2	1	4.3	-10.7	11.5
44616	54.1	-45.2	ALL	SPEED	SUR	331	1	0	4.1	-9.6	10.5
44777	51.2	-24.1	ALL	SPEED	SUR	73	0	0	5.2	-11.7	12.8
44778	58.4	-31.6	ALL	SPEED	SUR	104	0	0	3.8	-12.2	12.7
44779	54.1	-32.2	ALL	SPEED	SUR	104	0	0	4.7	-12.4	13.3
55583	-37.0	170.7	ALL	SPEED	SUR	472	0	0	2.3	-5.5	6.0
56513	-14.0	75.5	ALL	SPEED	SUR	113	0	0	3.0	-6.2	6.9
WIND DIRECTION											
21528	45.6	150.5	ALL	DIRN.	SUR	132	0	0	81.8	73.7	110.1
32321	0.0	9.0	ALL	DIRN.	SUR	46	0	0	23.1	-53.2	57.9
42027	1.1	10.8	ALL	DIRN.	SUR	22	0	0	22.1	42.5	48.0
44513	59.7	-36.1	ALL	DIRN.	SUR	234	0	0	19.3	31.8	37.2
44614	56.3	-41.8	ALL	DIRN.	SUR	356	2	1	45.9	81.9	93.9
44616	54.1	-45.2	ALL	DIRN.	SUR	274	1	0	62.4	75.2	97.7
44777	51.2	-24.1	ALL	DIRN.	SUR	66	0	0	113.5	29.6	117.3
44778	58.4	-31.6	ALL	DIRN.	SUR	98	0	0	67.7	87.6	110.7
44779	54.1	-32.2	ALL	DIRN.	SUR	100	0	0	88.3	78.4	118.1
52006	0.3	5.3	ALL	DIRN.	SUR	30	0	0	29.8	-40.8	50.5
52521	15.2	133.3	ALL	DIRN.	SUR	98	0	0	50.7	123.0	133.0
55589	-21.9	152.6	ALL	DIRN.	SUR	32	0	0	94.6	-60.8	112.5
56513	-14.0	75.5	ALL	DIRN.	SUR	71	0	0	79.7	-62.7	101.4

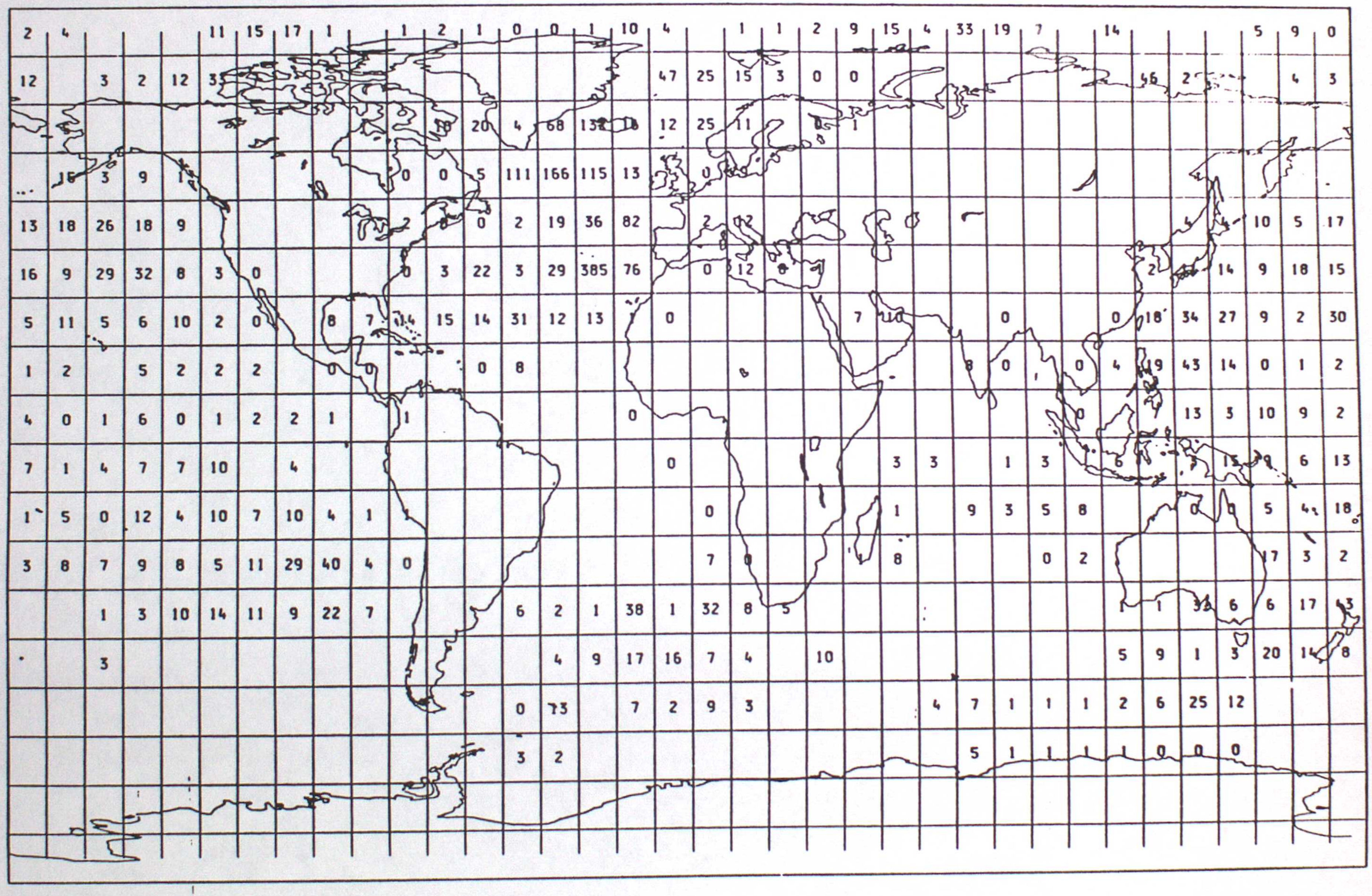
AVAILABILITY - DRIBU - NOVEMBER 1993

FIGURE 2

MAIN HOURS ONLY

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

TOTAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 3461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3 2 5 1 1 1 1 0 0 0

TABLE 3

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH:November, 93

Monitoring procedures:

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from Bracknell global model.

Observation times :All hours combined.

Level(s) monitored :70.0 - 500.0 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored :N REP.:Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP $\geq$ 20

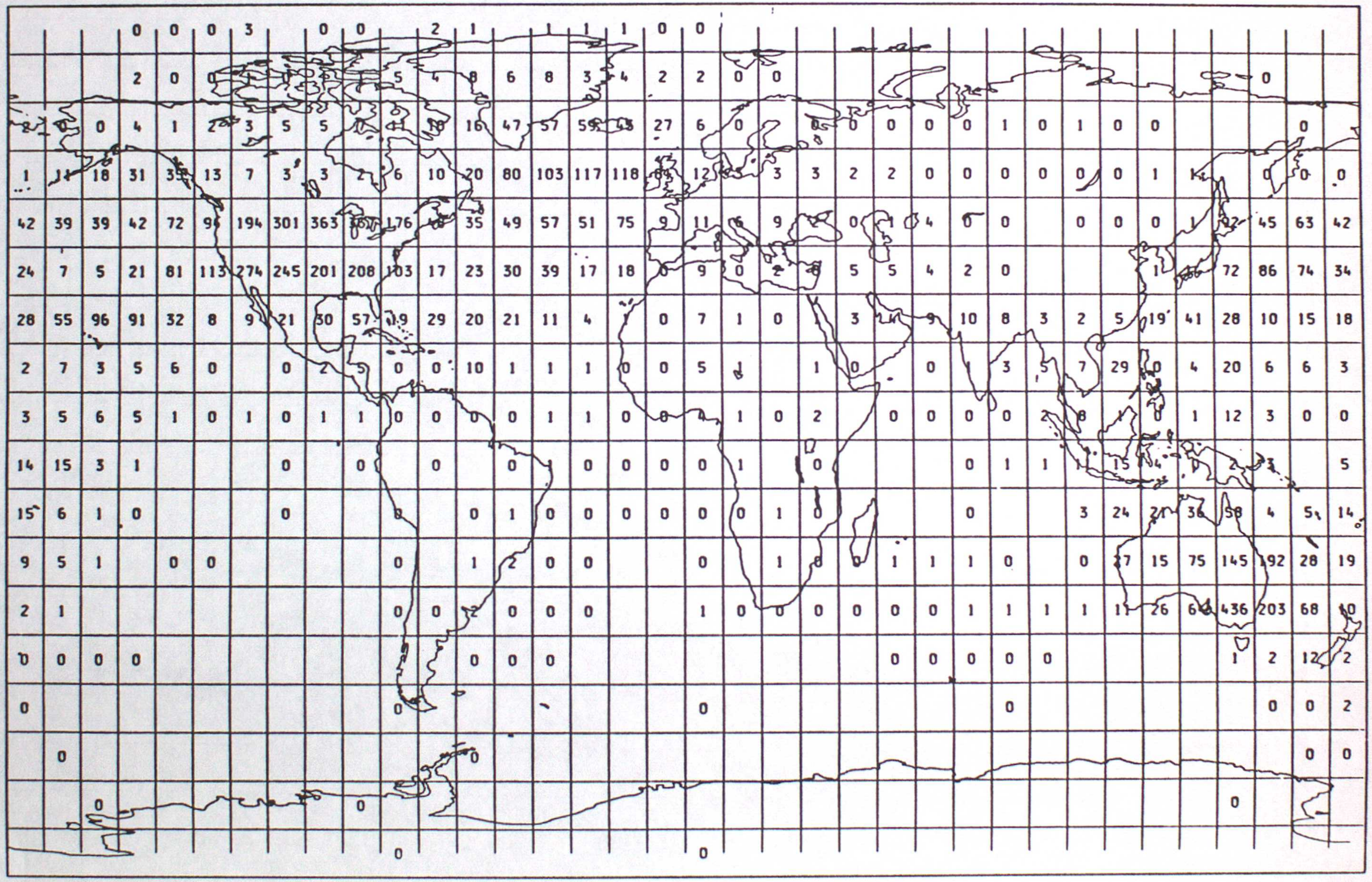
NB:- DUE TO A TEMPORARY ARCHIVING PROBLEM STATISTICS FOR IDENTIFIERS UAL, AN, BA, CO, DL, KL, NW AND QF DO NOT INCLUDE DATA BETWEEN 1500 UTC AND 2100 UTC. THIS DATA IS ALSO EXCLUDED FROM FIGURES 4 TO 7

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAA	97	3	5	2.0	0.0	97	0	1	0	9.2	2.4
AAL	2118	0	1	1.9	0.1	2143	0	2	0	9.3	1.6
AAR	879	1	2	1.9	-0.5	880	0	2	0	9.5	1.3
ACA	441	1	2	2.4	-0.4	447	0	0	0	8.5	0.5
ACI	55	0	0	1.6	0.6	54	0	2	0	7.4	-0.2
AEA	130	2	4	1.5	-0.1	124	0	7	0	12.8	-0.9
AEL	158	0	3	1.9	0.7	159	0	3	0	10.2	0.4
AFL	65	8	85	4.7	3.5	68	1	85	0	15.3	1.2
AFR	555	0	5	2.1	0.1	568	0	5	0	9.0	1.8
AJJ	119	0	5	3.2	0.8	119	0	4	0	12.8	4.0
AMT	94	3	4	1.9	1.2	100	0	0	0	8.6	1.9
AMX	291	1	4	1.8	0.0	294	0	5	0	10.7	0.6
ANA	730	0	1	2.1	0.4	728	0	1	0	9.0	1.1
ANZ	2470	1	2	1.9	-0.1	2461	0	2	1	8.5	1.4
AOM	470	3	4	2.1	0.8	482	0	4	0	10.1	1.3
ARG	23	0	0	1.7	0.7	23	0	0	0	7.8	3.5
ARP	397	1	5	1.7	0.0	385	0	5	2	8.1	1.8
ASY	32	6	0	1.2	-0.1	33	0	6	3	10.7	2.9
ATN	40	0	10	2.6	-0.9	42	0	14	0	11.7	1.1
AUA	34	3	94	1.9	-0.1	35	0	0	0	10.1	2.8
AVA	249	3	2	1.5	-0.2	250	0	5	0	12.2	1.8
AVN	40	0	0	1.8	-0.1	40	0	0	0	7.7	1.3
AVY	45	2	7	1.5	-1.0	45	0	4	0	8.6	0.4
AZA	309	2	5	2.1	0.5	314	0	5	0	11.0	2.4
BAL	70	0	23	2.0	-0.1	73	0	23	0	10.6	0.3
BAW	427	0	7	1.9	0.1	435	0	9	0	9.2	2.2
BWA	334	1	3	2.1	1.3	334	1	4	1	9.4	2.0
CAL	1312	0	3	2.0	-0.3	1310	0	5	0	9.9	1.3
CCA	185	2	77	2.4	-0.3	184	1	5	0	10.4	1.4
CDN	1473	0	3	2.0	0.5	1477	0	3	0	9.0	1.3
CES	137	1	1	2.0	0.3	138	0	2	0	11.8	1.2
CFC	31	0	13	2.6	1.2	31	0	16	0	9.5	-3.0
CFG	581	1	2	1.9	-1.0	578	0	2	0	9.5	1.0
CKS	96	5	72	3.5	-0.6	98	2	72	0	16.5	2.3
CKT	26	0	4	1.5	0.6	25	0	8	0	7.9	0.6
CLX	36	0	0	1.9	0.0	36	0	3	3	10.9	2.9
CMI	1276	1	3	2.0	0.3	1280	0	4	1	8.9	1.9
CMM	95	0	2	2.0	-0.5	97	0	4	0	10.1	0.5
COA	499	1	2	1.7	0.3	502	0	3	1	9.4	1.9
CPA	412	0	1	1.9	0.1	400	0	2	1	6.8	1.9
CRL	93	1	1	2.0	0.3	94	0	2	0	10.9	1.6
CTM	40	0	13	3.3	-2.1	40	0	10	0	11.1	4.7
CUB	68	0	78	3.0	1.4	69	1	10	0	13.8	3.3
DAL	3309	0	2	2.2	0.6	3142	0	2	0	9.4	1.6
DHL	104	0	6	2.7	-1.2	108	0	19	0	16.6	1.1
DLH	2632	0	7	1.9	-0.2	2619	0	9	2	8.5	1.4
DOA	68	0	9	2.4	0.8	72	1	14	0	10.9	1.7
EIA	199	2	10	2.5	0.6	205	0	8	0	10.2	3.2
ELY	58	0	10	2.3	0.5	63	0	8	0	11.7	2.3
EVA	655	0	3	2.0	-0.6	658	0	5	0	9.7	1.4
FDX	835	0	2	2.1	0.6	851	0	4	0	9.3	1.5
FIN	277	1	3	2.0	0.3	277	0	4	0	8.2	1.0
FJI	349	1	3	2.1	1.0	351	0	2	0	9.1	1.9
FMN	25	0	0	1.2	0.1	25	0	8	8	8.2	-1.0
GAF	34	0	0	2.5	-0.1	33	0	3	3	10.0	2.1
GEC	28	0	0	3.1	2.5	27	0	11	0	14.6	5.3
GIA	234	1	1	1.8	0.3	226	1	4	2	8.5	1.5
HAL	818	0	2	2.1	0.8	822	0	3	1	10.1	1.4
HLF	152	0	4	1.8	-1.1	156	1	4	0	9.1	0.7

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
IBE	1202	1	16	2.0	0.2	1204	0	17	0	10.3	1.3
ICE	189	1	1	2.4	0.9	191	0	2	0	9.1	-1.3
JAA	55	0	0	1.4	0.7	55	0	0	0	7.4	2.4
JAL	4076	0	1	1.9	0.2	4081	0	2	0	9.1	1.7
JAS	90	1	2	1.4	0.0	90	1	2	0	7.6	1.3
JAZ	116	0	2	1.8	0.7	116	0	1	0	9.5	1.8
KAL	2408	0	2	2.2	-0.1	2410	0	2	0	9.3	1.4
KLM	1175	0	2	2.1	0.5	1183	0	2	0	8.8	1.8
LDA	156	1	17	2.0	-1.2	156	0	18	0	10.0	0.8
LDI	45	0	4	1.7	-1.0	46	0	4	0	10.7	-1.1
LOT	150	2	5	2.0	0.0	152	1	3	0	10.2	-0.8
LTU	518	2	3	2.0	0.5	510	0	2	0	9.3	1.4
MAH	62	2	3	2.7	-1.1	63	0	5	0	11.9	0.1
MAS	279	0	1	2.0	0.1	277	0	5	3	9.8	0.8
MDA	69	0	3	3.2	1.7	69	0	3	0	9.6	1.5
MOD	22	0	18	3.5	-1.4	23	4	26	0	17.4	3.4
MPH	252	0	6	1.9	-0.2	251	0	6	0	10.3	1.8
MRS	22	5	5	1.9	0.3	21	0	10	0	13.6	5.6
NAL	113	2	3	2.2	1.3	112	0	4	1	11.2	0.5
NCA	363	0	0	1.9	-0.2	363	0	2	0	8.6	1.0
NGA	50	0	0	1.5	-0.2	49	0	0	0	11.6	2.8
NWA	9073	1	2	2.1	0.4	9119	0	3	1	9.2	1.4
PAL	561	6	7	2.4	-0.2	562	0	4	1	9.5	1.8
PAO	277	1	3	1.6	0.4	279	0	4	0	9.6	2.0
QFA	1647	1	2	1.9	0.1	1650	0	2	0	8.5	1.9
RAF	47	0	2	2.5	0.5	46	0	4	0	10.2	3.2
RAM	21	0	0	1.6	0.4	21	0	0	0	8.8	1.3
RKA	57	0	4	1.3	0.8	57	0	4	0	8.2	1.2
RON	74	0	0	1.4	0.4	75	0	4	4	6.0	-0.1
RRR	172	0	22	2.3	-0.1	174	0	20	0	10.3	1.3
SAA	194	1	3	2.0	-0.9	194	0	4	1	9.3	1.2
SAS	1570	0	1	2.0	0.0	1560	0	2	0	8.6	1.2
SIA	961	1	2	2.1	-0.4	952	0	4	1	9.9	1.3
SJM	32	0	6	1.8	-0.1	33	0	9	0	10.1	1.4
SOL	63	2	2	1.2	0.0	60	0	2	0	8.6	2.4
SPP	148	0	3	1.6	-0.2	141	0	5	0	10.1	0.6
STE	26	62	42	1.4	-0.8	26	0	0	0	10.0	3.7
SVA	68	4	4	1.3	0.1	76	0	8	1	11.4	0.3
SWR	222	1	5	1.9	0.1	206	0	6	0	9.4	1.9
TAP	363	0	1	2.2	-0.2	363	0	3	0	10.6	1.8
TEJ	24	0	13	2.1	0.6	25	0	12	0	10.1	2.9
THA	268	0	1	2.0	-0.3	274	0	3	1	9.0	0.9
TOW	74	0	1	2.4	-0.1	77	0	4	0	9.7	2.0
TWA	528	0	2	2.1	0.5	524	0	3	0	10.2	1.5
UAL	48205	0	6	1.6	0.1	48206	0	4	0	8.0	1.1
ULE	280	0	1	2.2	0.2	282	0	1	0	8.0	1.1
UPS	481	2	9	2.1	-0.1	493	0	10	0	10.9	1.8
VIA	389	1	8	1.8	0.5	388	0	8	0	9.7	2.7
VIR	34	0	0	2.0	0.4	35	3	3	0	9.3	1.7
VRB	22	5	0	2.4	1.1	22	0	5	0	11.1	1.0
VRG	33	0	0	2.2	-0.4	32	0	0	0	11.0	3.6
VSP	88	0	2	2.0	0.3	88	0	2	0	9.1	2.4
WOA	27	0	4	1.6	0.5	28	0	4	0	8.5	1.1
AN	26315	0	23	1.5	0.0	26047	0	23	0	8.5	1.6
BA	10539	0	24	2.0	0.9	10509	0	23	0	8.5	1.4
CO	362	0	24	1.6	0.3	355	0	25	0	7.4	1.8
DL	456	1	100	3.3	0.2	456	70	100	0	46.9	0.1
KL	4456	0	73	2.3	1.6	4452	0	16	0	8.8	1.9
LH	299	0	9	2.3	0.0	296	0	10	1	10.2	1.7
NW	31256	0	1	1.6	0.3	31216	0	2	0	7.2	1.1
QF	6652	0	22	1.3	0.2	6642	0	22	0	7.8	1.3

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
M	306	4	75	2.7	0.1	304	0	8	0	11.7	1.6
N	235	3	5	2.3	0.4	242	0	3	0	10.3	2.2

MEAN DAILY COUNT OF AIRCRAFT 70 - 500 HPA FIGURE 3
NOVEMBER 1993
OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED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24 7 5 21 81 113 274 245 201 208 103 17 23 30 39 17 18 0 9 0 2 8 5 5 4 2 0 1 16 72 86 74 34
28 55 96 91 32 8 9 21 30 57 19 29 20 21 11 4 1 0 7 1 0 1 3 14 9 10 8 3 2 5 19 41 28 10 15 18
2 7 3 5 6 0 0 2 5 0 0 10 1 1 1 0 0 5 1 1 0 0 1 3 5 7 29 0 4 20 6 6 3
3 5 6 5 1 0 1 0 1 1 0 0 0 0 1 1 0 0 4 1 0 2 0 0 0 0 2 8 1 0 1 12 3 0 0
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15 6 1 0 0 0 0 1 0 0 0 0 0 0 1 0 0 3 24 21 36 58 4 5 14
9 5 1 0 0 0 1 2 0 0 0 1 0 0 1 1 1 0 0 27 15 75 145 192 28 19
2 1 0 0 2 0 0 0 1 0 0 0 0 0 0 1 1 1 1 11 26 64 436 203 68 10
0 0 0 0 0 0 0 0 0 0 0 0 0 1 2 12 2
0 0 0 0 0 0 2
0 0 0 0
0 0 0
0 0

FIGURE 4

AIRCRAFT MEAN WINDS BETWEEN 70 AND 500 HPA
NOVEMBER 1993
OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

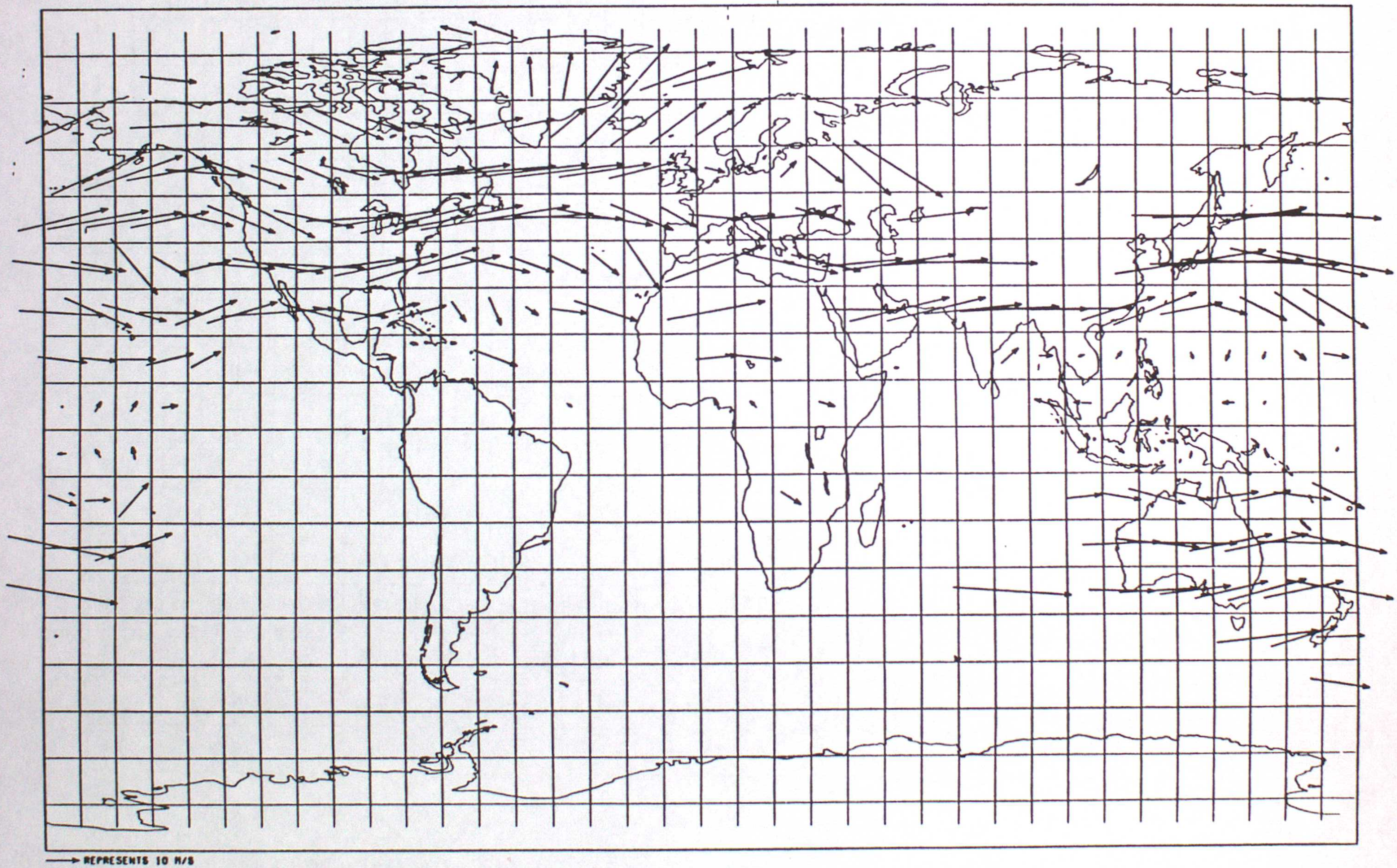
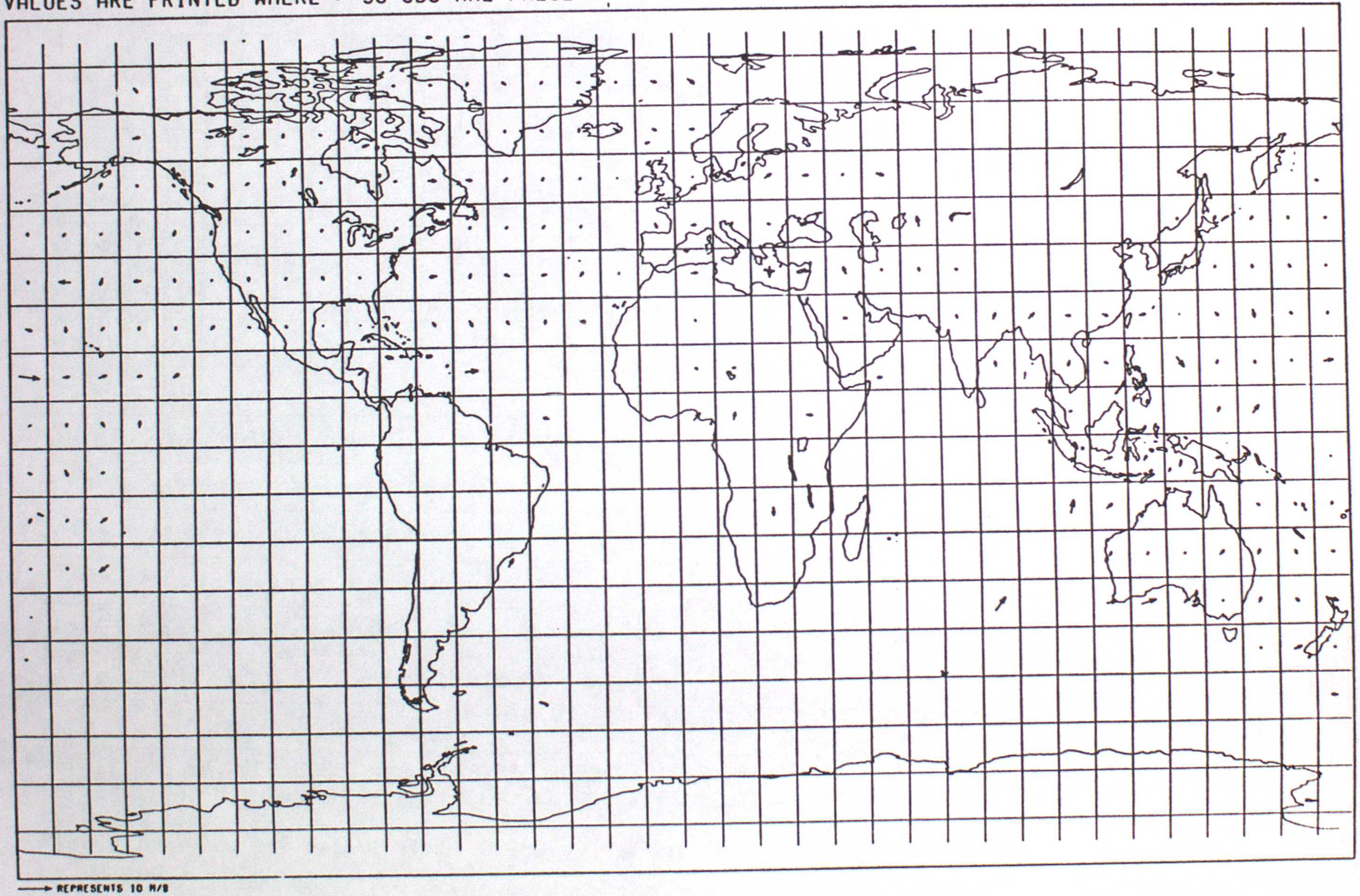
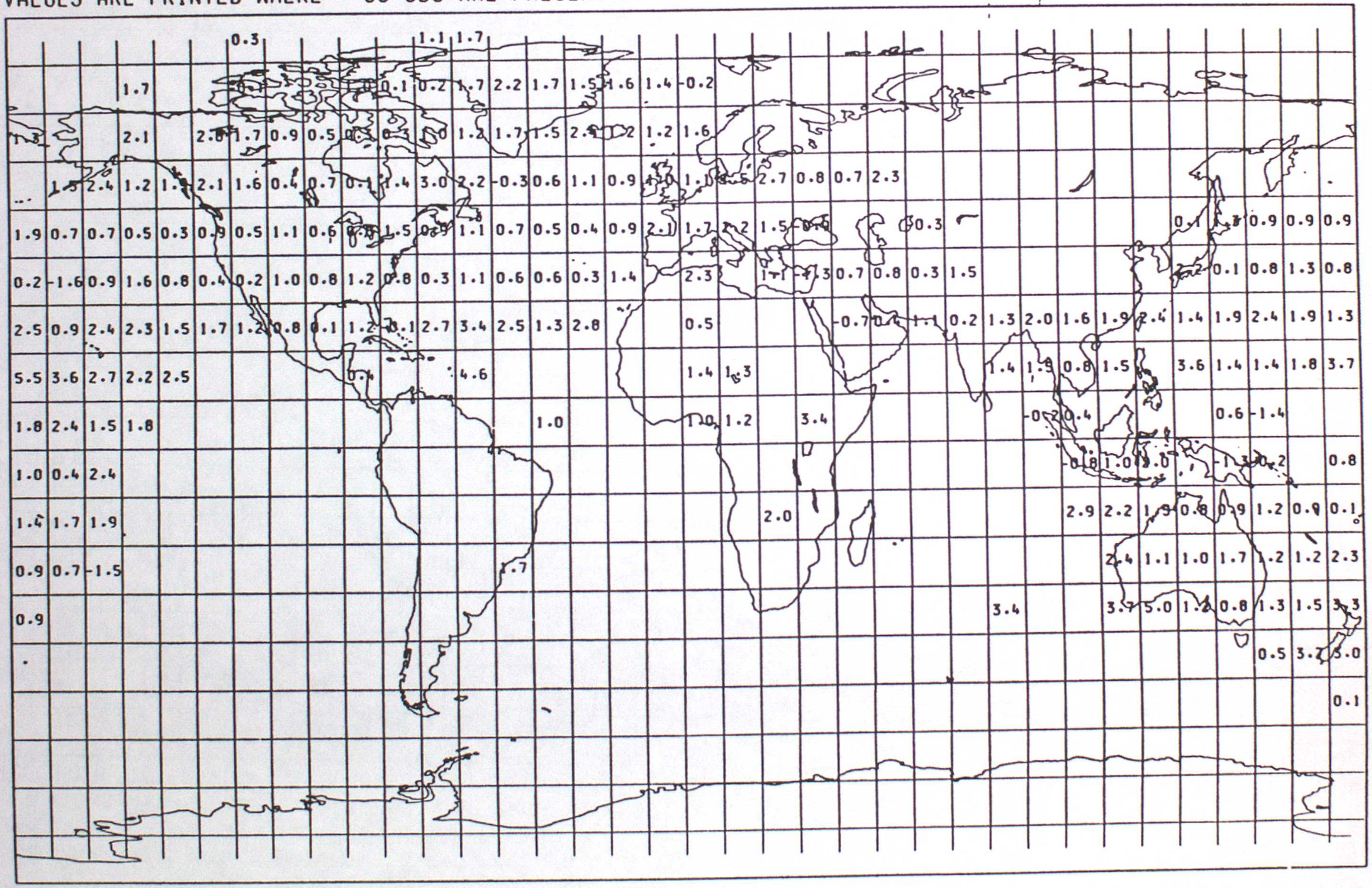


FIGURE 5

AIRCRAFT MEAN O-B WINDS BETWEEN 70 AND 500 HPA
NOVEMBER 1993
OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT



AIRCRAFT : MEAN O-B SPEEDS (M/S) BETWEEN 70 AND 500 HPA FIGURE 6
NOVEMBER 1993
OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT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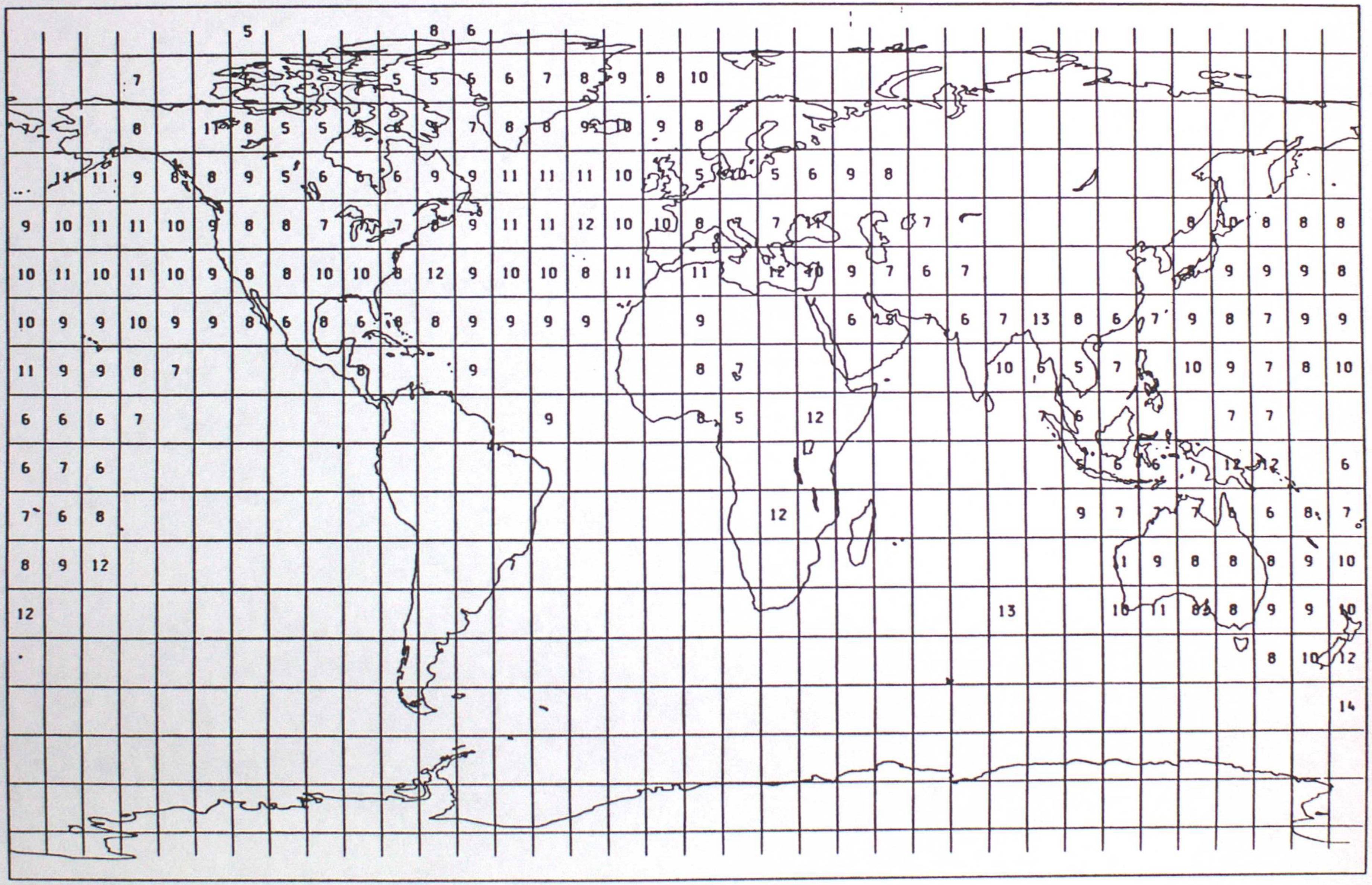
2.1 1.7 0.9 0.5 1.2 1.7 1.5 1.2 1.6
2.4 1.2 2.1 1.6 0.4 0.7 1.4 3.0 2.2 -0.3 0.6 1.1 0.9 2.7 0.8 0.7 2.3
1.9 0.7 0.7 0.5 0.3 0.9 0.5 1.1 0.6 1.5 1.1 0.7 0.5 0.4 0.9 2.1 1.7 1.5 0.3 0.1 0.9 0.9 0.9
0.2 -1.6 0.9 1.6 0.8 0.4 0.2 1.0 0.8 1.2 0.8 0.3 1.1 0.6 0.6 0.3 1.4 2.3 0.7 0.8 0.3 1.5 0.1 0.8 1.3 0.8
2.5 0.9 2.4 2.3 1.5 1.7 1.2 0.8 0.1 1.2 2.7 3.4 2.5 1.3 2.8 0.5 -0.7 1.1 0.2 1.3 2.0 1.6 1.9 2.4 1.4 1.9 2.4 1.9 1.3
5.5 3.6 2.7 2.2 2.5 4.6 1.4 1.3 1.4 1.5 0.8 1.5 3.6 1.4 1.4 1.8 3.7
1.8 2.4 1.5 1.8 1.0 1.0 1.2 3.4 0.4 0.6 -1.4
1.0 0.4 2.4 -0.8 1.0 0.2 0.8
1.4 1.7 1.9 2.0 2.9 2.2 1.9 0.8 0.9 1.2 0.9 0.1
0.9 0.7 -1.5 .7 2.4 1.1 1.0 1.7 1.2 1.2 2.3
0.9 3.4 5.0 1.2 0.8 1.3 1.5 3.3
0.5 3.2 3.0
0.1

AIRCRAFT : RMS O-B VECTOR (M/S) BETWEEN 70 AND 500 HPA FIGURE 7
NOVEMBER 1993
OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT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11 9 9 8 7 8 9 8 7 10 6 5 7 10 9 7 8 10
6 6 6 7 9 8 5 12 7 6 7 7
6 7 6 5 6 6 12 12 6
7 6 8 12 9 7 7 7 6 6 8 7
8 9 12 1 9 8 8 8 9 10
12 13 10 11 8 8 9 9 10
8 10 12
14

TABLE 4

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH:November, 93

Monitoring procedures:

Period	:One calendar month.	
Data monitored	:Reports from each unique identifier for radiosonde TEMPs.	
Area monitored	:90°N - 90°S, 180°W - 180°E.	
Standard of comparison	:Background field from Bracknell global model.	
Observation times	:00 UTC and 12 UTC.	
Level(s) monitored	:Standard levels between 1000.0 - 30.0 hPa	
Element monitored	:GEOPOTENTIAL HEIGHT IN metres	
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.1	
SELECTION CRITERIA	:≥ 3 levels with ≥ 10 observations and ≥ 100 m weighted RMS.	

ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
22522	00	Z	70	65/ 35	22	1	142.5	50.2	151.1	4
26258	12	Z	30	58/ 28	27	0	103.9	140.5	174.8	8
31168	00	Z	150	56/ 138	23	0	99.4	42.7	108.2	5
37985	00	Z	250	39/ 49	16	1	63.4	73.3	96.9	7
38836	00	Z	250	39/ 69	25	1	76.6	-74.2	106.7	7
40179	12	Z	30	32/ 35	14	0	35.8	215.4	218.3	4
41594	00	Z	250	32/ 73	16	0	88.7	-73.8	115.4	9
41977	00	Z	300	22/ 92	16	0	54.3	-64.9	84.6	7
42027	12	Z	250	34/ 75	10	1	62.0	119.6	134.7	5
42101	00	Z	70	30/ 76	9	1	186.2	70.9	199.2	9
42182	00	Z	100	29/ 77	24	2	121.2	-66.9	138.4	7
42182	12	Z	50	29/ 77	16	1	217.6	-21.4	218.7	7
42314	00	Z	50	27/ 95	9	1	217.2	66.7	227.2	8
42314	12	Z	150	27/ 95	8	2	66.7	-179.4	191.4	6
42339	00	Z	150	26/ 73	15	2	112.8	-28.1	116.2	5
42339	12	Z	150	26/ 73	17	0	118.1	-6.8	118.3	4
42369	00	Z	150	27/ 81	21	1	123.0	-23.9	125.3	9
42369	12	Z	70	27/ 81	15	4	201.4	-105.3	227.3	9
42379	00	Z	70	27/ 83	16	3	243.1	20.8	244.0	9
42379	12	Z	50	27/ 83	12	1	208.0	73.8	220.7	9
42410	00	Z	30	26/ 92	21	4	179.5	140.5	227.9	6
42410	12	Z	70	26/ 92	17	3	197.0	-20.1	198.0	8
42647	00	Z	100	23/ 73	11	0	145.4	-6.3	145.5	5
42647	12	Z	250	23/ 73	15	0	89.3	26.7	93.2	7
42701	00	Z	300	23/ 85	20	1	73.6	-5.1	73.7	5
42724	00	Z	200	24/ 91	10	0	102.4	67.4	122.6	5
42779	00	Z	70	23/ 82	13	1	145.6	4.9	145.7	6
42809	00	Z	30	23/ 88	16	2	137.1	235.3	272.3	7
42809	12	Z	50	23/ 88	17	0	178.2	17.1	179.0	6
42867	00	Z	30	21/ 79	11	3	197.8	91.6	218.0	6
42971	00	Z	50	20/ 86	14	2	194.4	96.9	217.3	6
42971	12	Z	100	20/ 86	21	0	134.5	-45.7	142.1	6
43003	12	Z	200	19/ 73	21	1	127.7	20.1	129.3	8
43128	00	Z	50	17/ 78	10	0	209.1	71.2	220.9	8
43128	12	Z	50	17/ 78	10	2	141.1	-9.9	141.5	6
43150	00	Z	200	18/ 83	19	0	91.0	-20.8	93.3	5
43150	12	Z	400	18/ 83	29	0	56.4	-23.5	61.1	4
43185	00	Z	50	16/ 81	14	0	229.0	97.4	248.8	8
43185	12	Z	70	16/ 81	10	0	206.1	52.5	212.7	6
43192	00	Z	100	15/ 74	13	1	167.0	-3.1	167.0	6
43279	00	Z	50	13/ 80	11	0	191.2	14.3	191.7	6
43279	12	Z	150	13/ 80	23	0	103.1	47.3	113.4	6
43285	00	Z	50	13/ 75	16	1	164.3	75.1	180.7	4
43285	12	Z	70	13/ 75	14	1	101.2	102.3	143.9	4
43295	00	Z	70	13/ 78	19	0	94.8	202.8	223.9	6
43295	12	Z	50	13/ 78	12	1	86.7	175.9	196.1	7
43311	12	Z	200	11/ 73	16	1	92.3	56.5	108.2	5
43333	12	Z	100	12/ 93	10	1	136.5	-26.0	139.0	4
43346	00	Z	100	11/ 80	18	1	133.4	-44.3	140.5	7
43346	12	Z	70	11/ 80	15	2	163.6	54.1	172.3	10
43353	00	Z	100	10/ 76	13	1	159.6	-105.9	191.5	5
43353	12	Z	150	10/ 76	13	2	119.7	54.5	131.6	5
43369	00	Z	70	8/ 73	14	1	187.7	-39.9	191.9	7
43369	12	Z	70	8/ 73	12	1	196.0	98.4	219.3	9
43371	00	Z	70	8/ 77	15	2	164.3	-11.4	164.7	6
43371	12	Z	50	8/ 77	10	4	171.0	76.6	187.4	7
44288	00	Z	200	46/ 103	9	4	91.5	153.0	178.3	7
44288	12	Z	200	46/ 103	7	5	73.3	181.1	195.4	5
48407	00	Z	30	15/ 105	12	0	33.3	186.8	189.8	8
48407	12	Z	500	15/ 105	18	0	17.7	61.1	63.6	8
56739	12	Z	1000	25/ 98	8	0	18.2	72.8	75.0	4
57516	12	Z	100	30/ 106	21	1	35.2	121.1	126.1	5
60360	12	Z	500	37/ 8	4	14	20.2	-107.8	109.6	9

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
61831	12	Z	500	10/ -14	1	17	0.0	-146.0	146.0	8
62306	12	Z	70	31/ 27	10	2	71.7	302.6	311.0	7
62378	12	Z	100	30/ 31	13	4	77.0	174.7	190.9	6
68240	12	Z	150	-24/ 26	19	1	90.0	37.7	97.6	5
82332	12	Z	70	-3/ -60	18	0	54.5	137.3	147.7	4
83208	12	Z	30	-13/ -60	11	0	30.2	202.0	204.2	5
83746	12	Z	30	-23/ -43	13	0	43.1	193.7	198.4	5
89002	12	Z	400	-71/ -8	28	0	48.5	53.7	72.3	8
89022	12	Z	250	-75/ -27	28	0	45.6	66.1	80.4	4
91557	12	Z	700	-18/ 168	22	1	8.3	-90.0	90.4	9

AVAILABILITY - TEMP - 500 HPA GEOPOTENTIAL - NOVEMBER 1993
ALL HOURS
10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS
TOTAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS - 1450

FIGURE 8

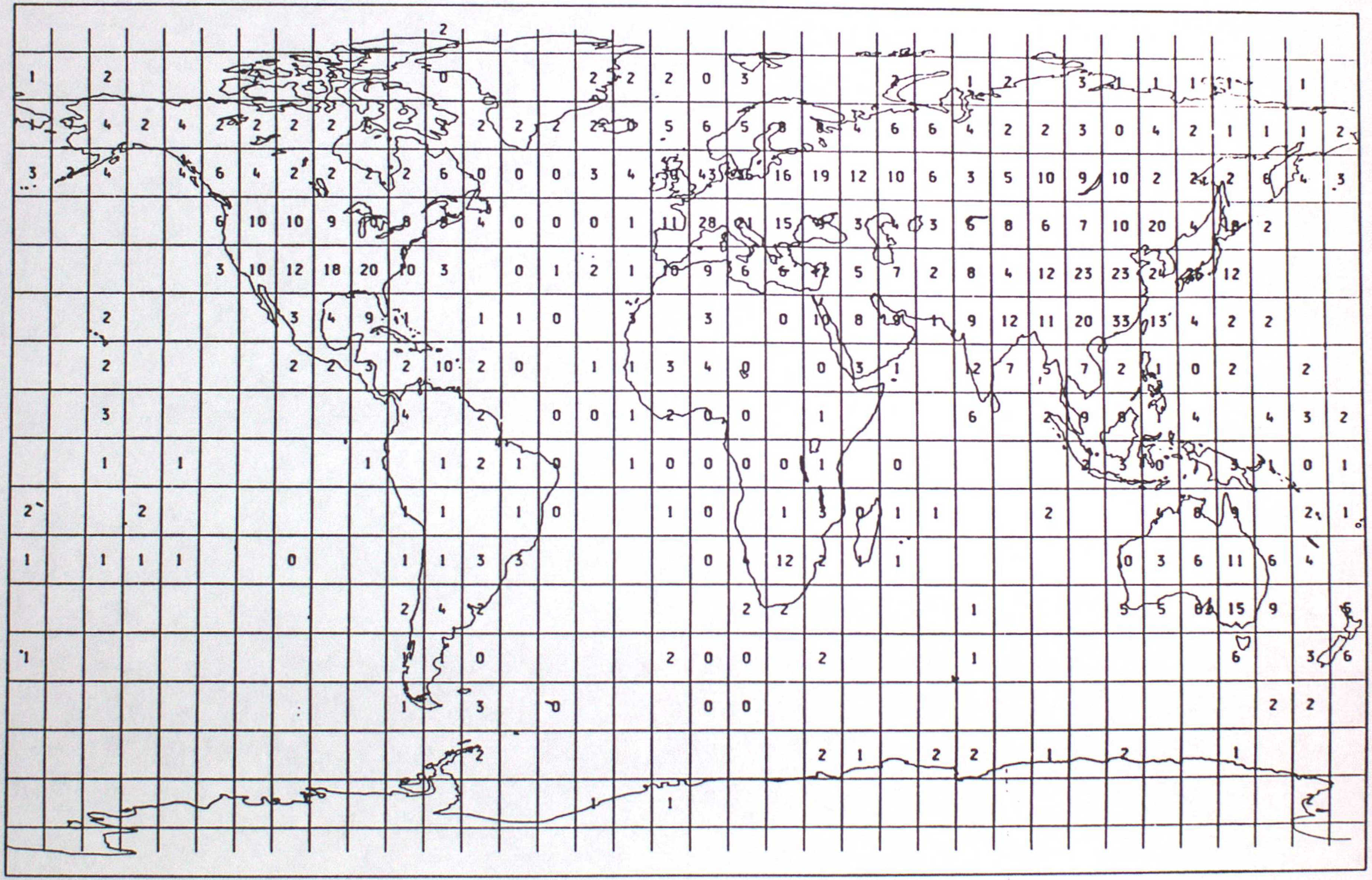


TABLE 5

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH:November, 93

Monitoring procedures:

Period :One calendar month.

Data monitored :Reports from each unique identifier for radiosonde TEMPs.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from Bracknell global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 1000.0 - 100.0 hPa

Element monitored :VECTOR WIND in m s^{-1}

Parameters monitored

:NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:% REJ :Percentage of observations rejected by quality control at level shown during period.

:UBIAS,VBIAS :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

:NUM LEVELS :Number of levels satisfying selection criteria.

GROSS ERROR LIMITS :Defined in Appendix I.2

SELECTION CRITERIA :≥ 10 observations and ≥ 15 m s^{-1} RMS vector wind.

ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa
WITH HIGHEST RMS IS SHOWN

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS
15480	00	V	250	44/ 29	18	0	16	-13.3	3.0	17.2	2
41661	00	V	200	30/ 67	12	0	100	-31.7	-7.9	33.0	5
41977	00	V	100	22/ 92	11	0	27	-0.5	-19.4	16.8	1
42101	00	V	100	30/ 76	10	0	30	-9.0	-1.4	15.6	1
42647	12	V	250	23/ 73	13	0	7	3.5	-0.2	15.7	1
60155	00	V	200	34/ -8	11	0	18	-5.5	0.6	15.7	1
60571	00	V	200	32/ -2	19	0	10	-7.8	-7.2	16.6	1
61901	12	V	250	-16/ -6	21	0	19	5.7	-2.6	18.8	1
87418	12	V	200	-33/ -69	19	0	100	5.3	2.2	19.0	1

AVAILABILITY - TEMP/PILOT - 300 HPA WIND - NOVEMBER 1993 FIGURE 9
ALL HOURS
10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS
TOTAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS - 1276

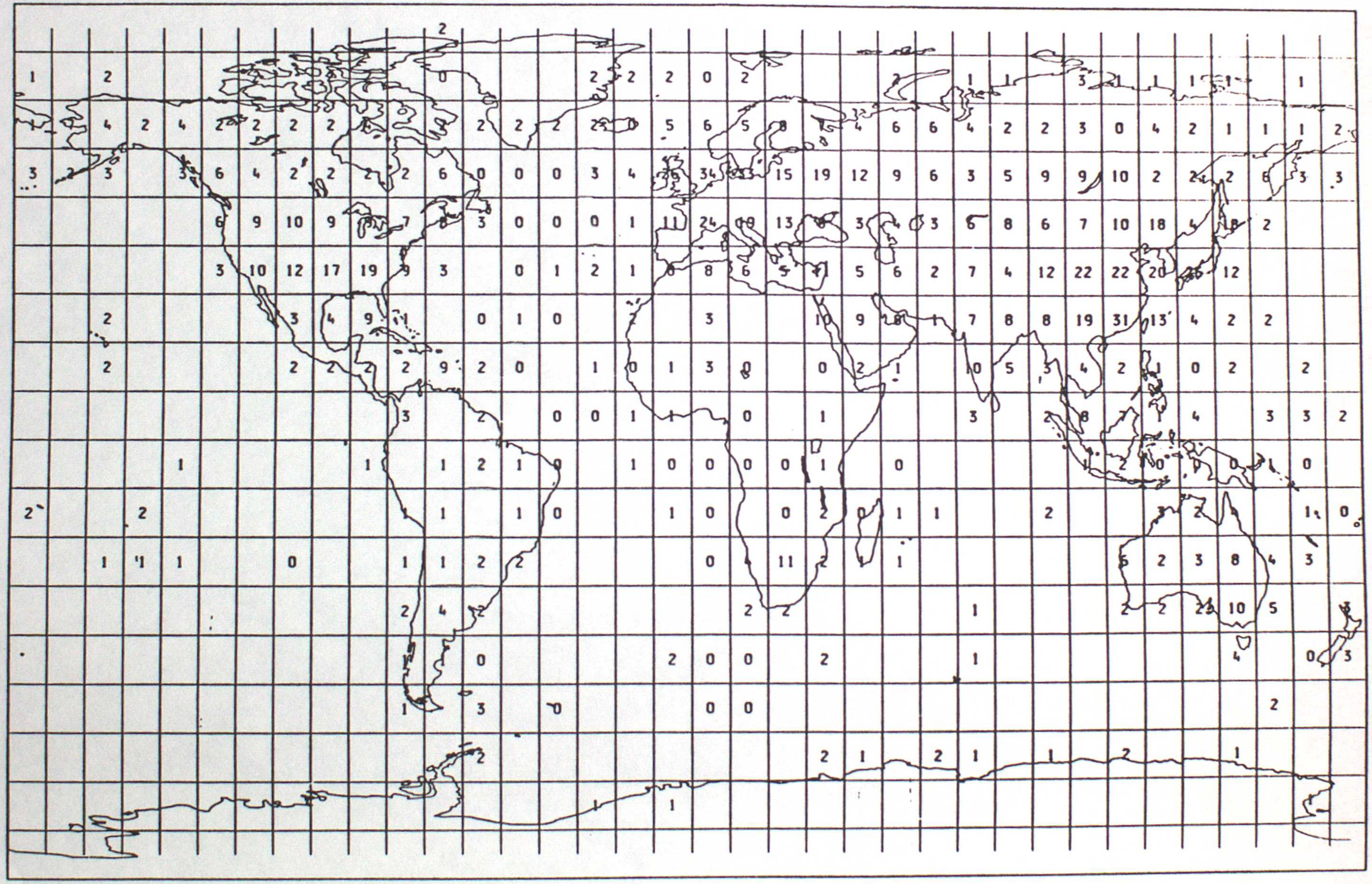


TABLE 6

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH:November, 93

Monitoring procedures:

Period :One calendar month.

Data monitored :Reports from each unique identifier for radiosonde TEMPs.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from Bracknell global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 500.0 - 150.0 hPa

Element monitored :WIND DIRECTION in degrees

Parameters monitored

- :NUM OBS :Average number of observations at all levels.
- :BIAS :Mean difference of observations from background values from all levels.
- :MAX SPREAD :(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels.
- :SD :SD of difference of observations from background values at all levels.

SELECTION CRITERIA :NUM OBS ≥ 5, and
ABSOLUTE BIAS ≥ 10°, with
SD < 30°, and
MAX SPREAD < 10°

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
CLASS	00	DD	0/ 167	7	12.6	9.9	27.6
27962	00	DD	53/ 45	24	-13.1	9.1	27.5
28952	00	DD	53/ 64	24	-26.9	4.6	11.9
28952	12	DD	53/ 64	24	-22.5	4.5	8.7
35108	00	DD	51/ 51	27	-19.7	5.4	12.9
42410	12	DD	26/ 92	16	-12.0	7.4	15.8
43150	00	DD	18/ 83	10	-11.7	8.7	23.8
43371	00	DD	8/ 77	11	12.1	5.2	27.1
60571	00	DD	32/ -2	19	11.3	7.2	12.1
60571	12	DD	32/ -2	23	10.2	3.4	13.2

MONITORING OF SATELLITE WINDS

MONITORING CENTRE: BRACKNELL

MONTH:November, 93

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from GOES, METEOSAT, GMS, INSAT.

Standard of comparison :Background field from Bracknell global model.

Selection Criteria :number of observations > 10.

Data Extracted :Layer:
701 - 1000 hPa
401 - 700 hPa
101 - 400 hPa

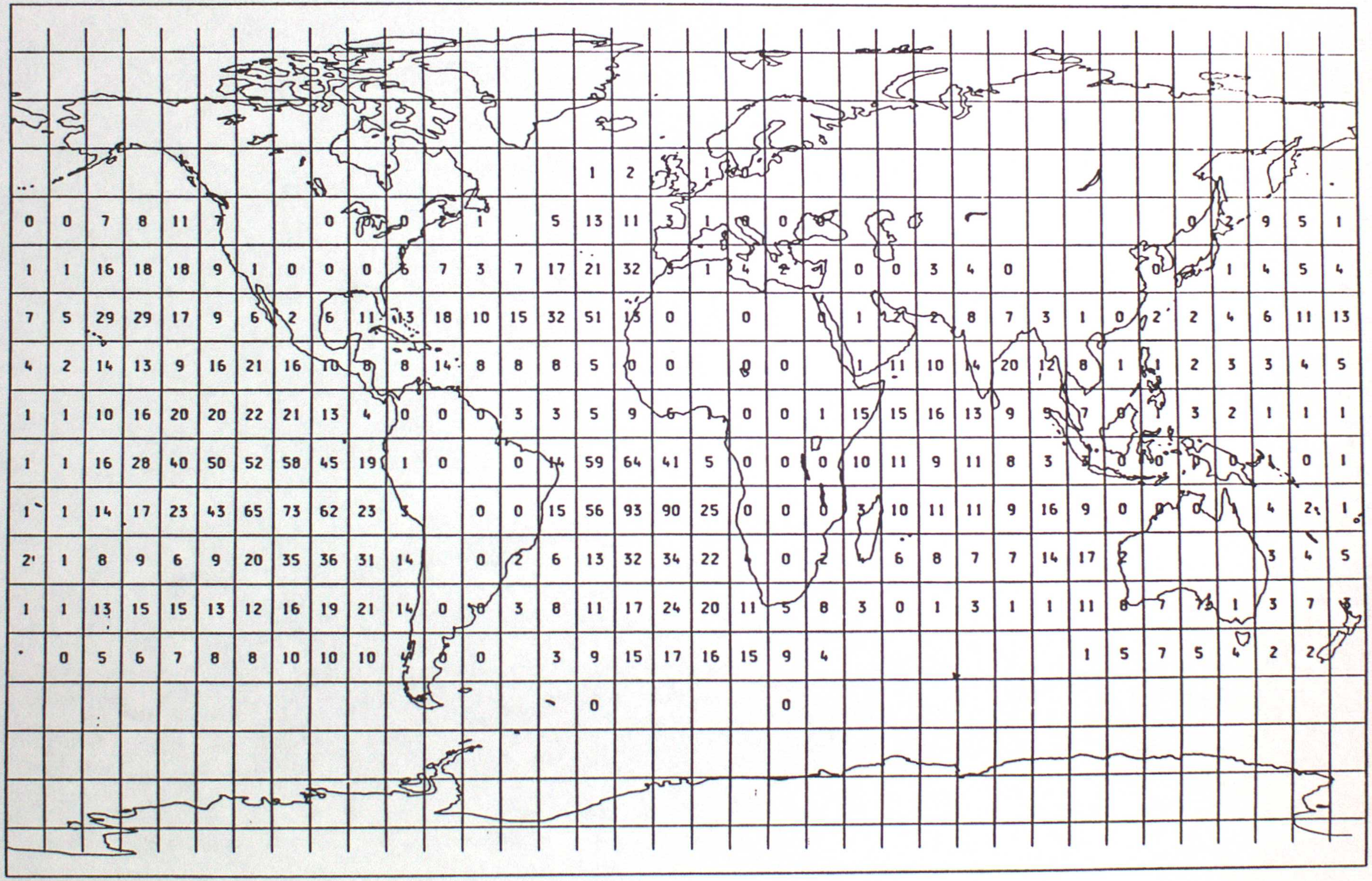
:Mean wind

:Mean observation minus background vector wind differences

:Mean observation minus background speed differences

:RMS of observation minus background vector differences

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 701 AND 1000 HPA FIGURE 10
NOVEMBER 1993


1 2 1
0 0 7 8 11 7 0 0 1 5 13 11 3 1 0 0 0 0 2 9 5 1
1 1 16 18 18 9 1 0 0 0 6 7 3 7 17 21 32 3 1 4 2 1 0 0 3 4 0 0 1 4 5 4
7 5 29 29 17 9 6 2 6 11 13 18 10 15 32 51 15 0 0 0 1 2 2 8 7 3 1 0 2 2 4 6 11 13
4 2 14 13 9 16 21 16 10 8 8 14 8 8 8 5 0 0 0 0 1 11 10 14 20 12 8 1 1 2 3 3 4 5
1 1 10 16 20 20 22 21 13 4 0 0 0 3 3 5 9 6 1 0 0 1 15 15 16 13 9 5 7 8 1 3 2 1 1 1
1 1 16 28 40 50 52 58 45 19 1 0 0 14 59 64 41 5 0 0 0 10 11 9 11 8 3 3 0 0 0 0 1 0 1
1 1 14 17 23 43 65 73 62 23 3 0 0 15 56 93 90 25 0 0 0 3 10 11 11 9 16 9 0 0 0 4 2 1
2 1 8 9 6 9 20 35 36 31 14 0 2 6 13 32 34 22 4 0 2 4 6 8 7 7 14 17 2 3 4 5
1 1 13 15 15 13 12 16 19 21 14 0 10 3 8 11 17 24 20 11 5 8 3 0 1 3 1 1 11 8 7 13 1 3 7 3
0 5 6 7 8 8 10 10 10 4 0 0 3 9 15 17 16 15 9 4 1 5 7 5 4 2 2
0 0

SATOB VECTOR MEAN WINDS BETWEEN 701-1000 HPA
NOVEMBER 1993
ALL OBSERVATIONS
ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT

FIGURE 11

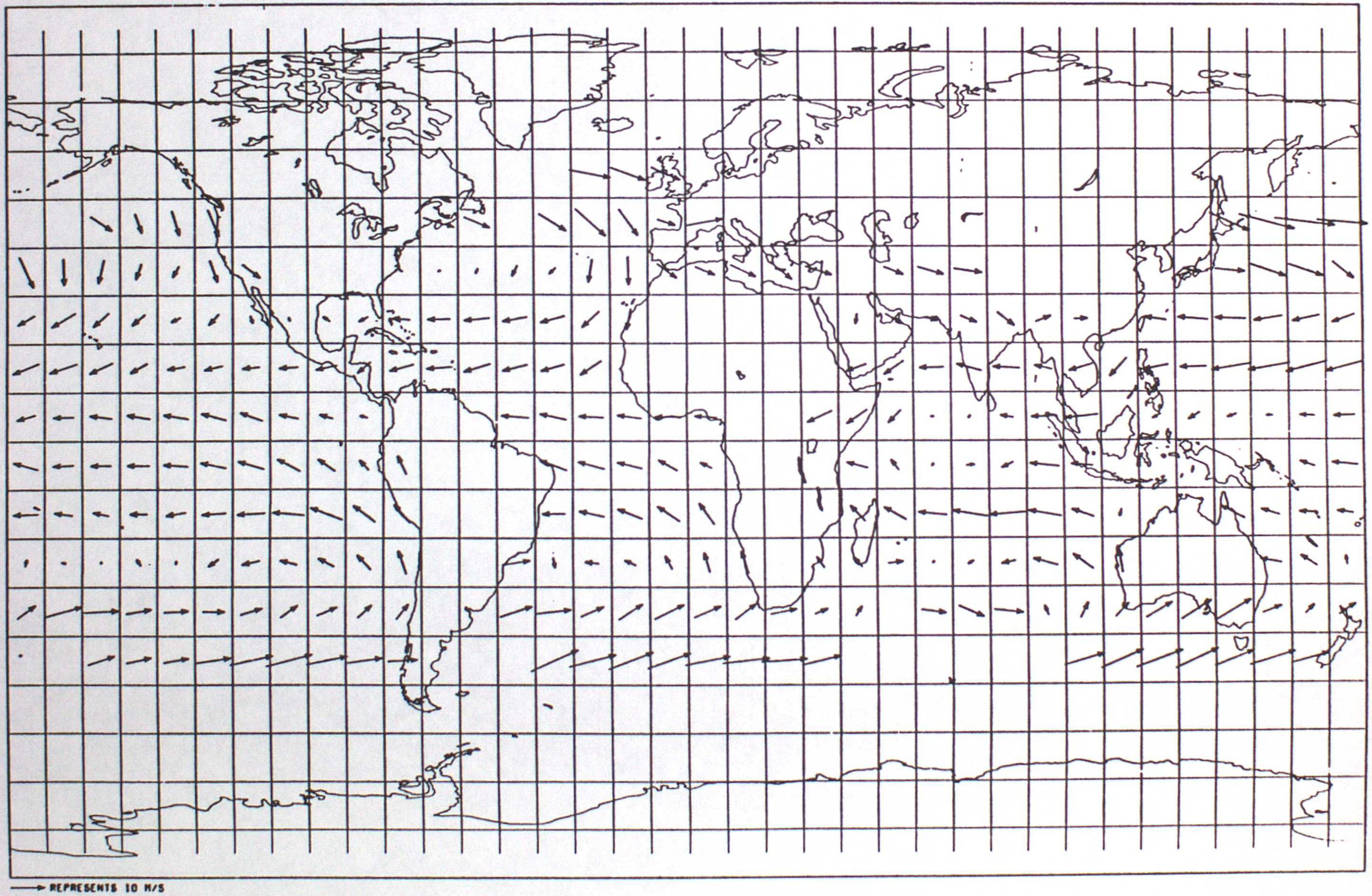
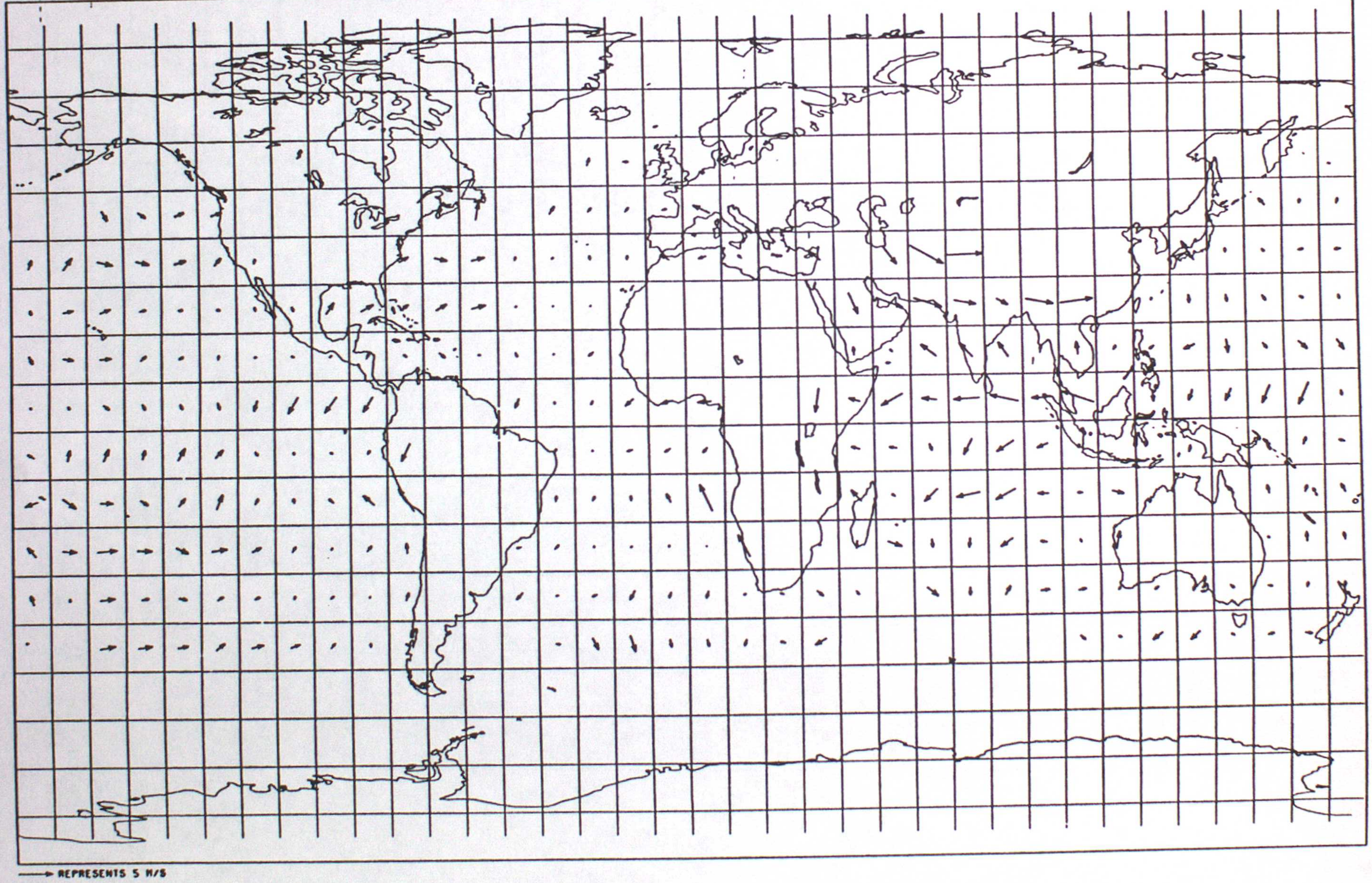
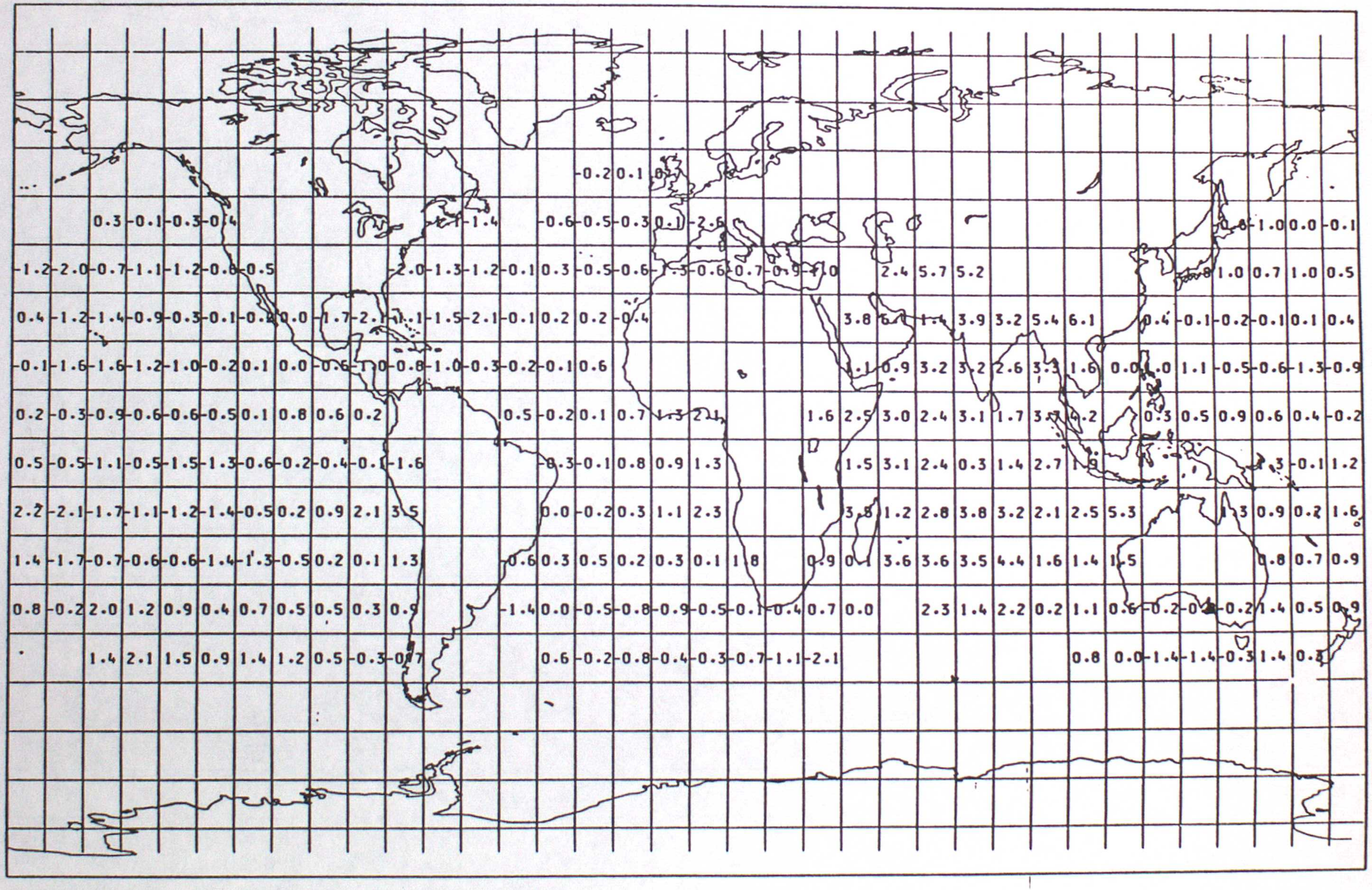

→ REPRESENTS 10 M/S

FIGURE 12

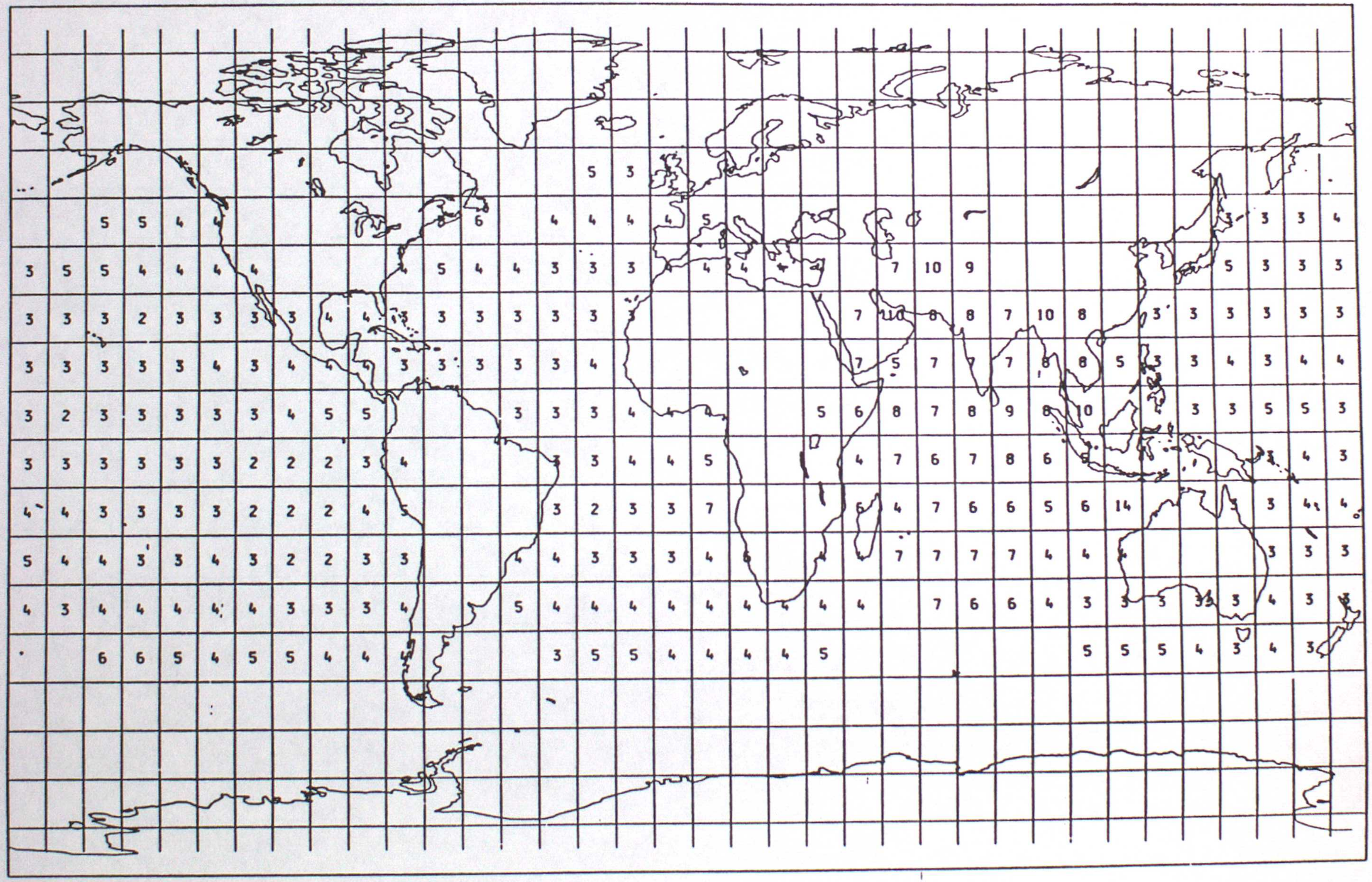
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 701-1000 HPA
NOVEMBER 1993
ALL OBSERVATIONS
ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT


→ REPRESENTS 5 M/S

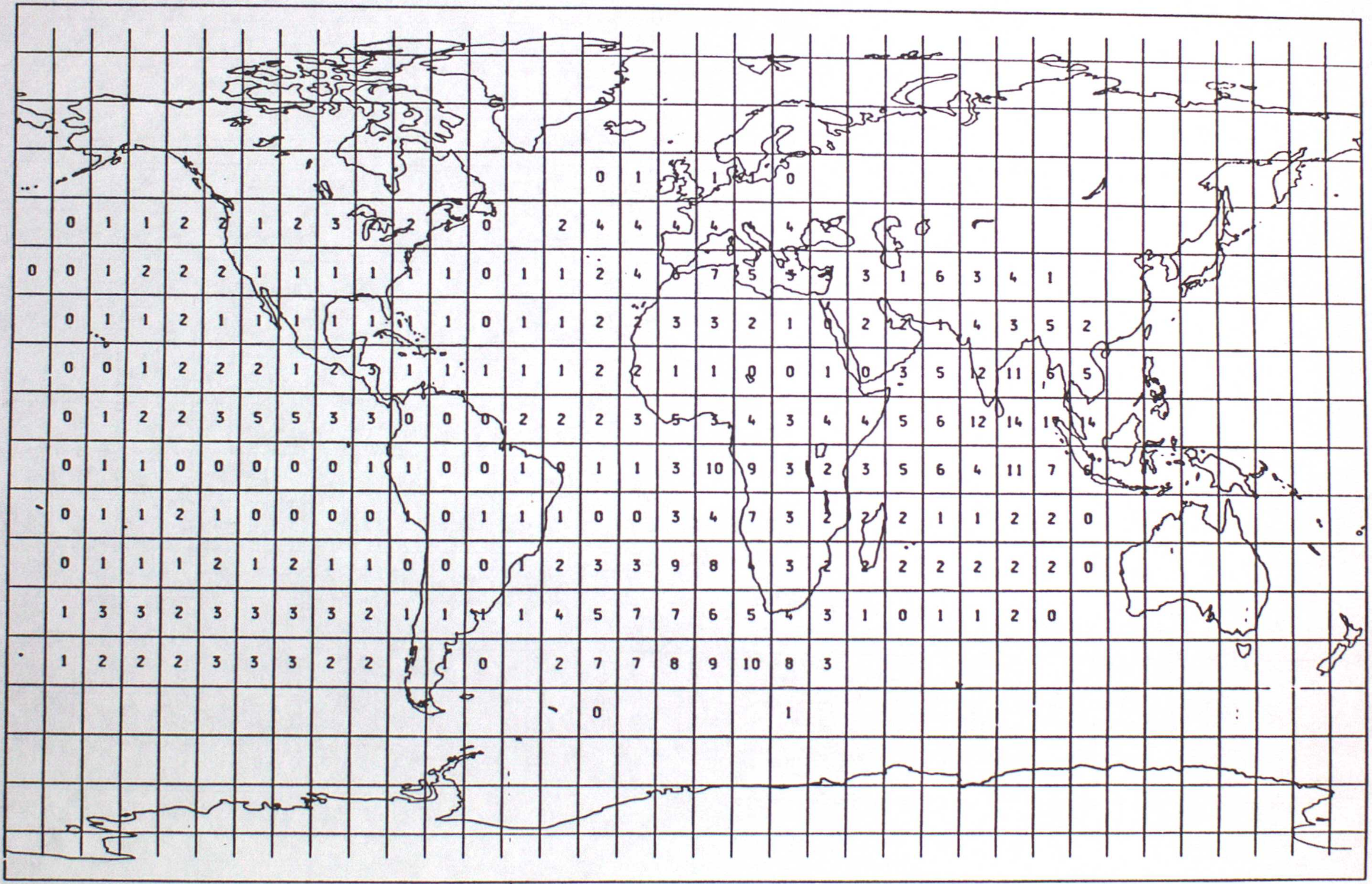
SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 13
NOVEMBER 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT


-0.2 0.1
0.3 -0.1 -0.3 -0.4 -1.1 -1.4 -0.6 -0.5 -0.3 0.1 -2.6 -0.8 -1.0 0.0 -0.1
-1.2 -2.0 -0.7 -1.1 -1.2 -0.8 -0.5 -2.0 -1.3 -1.2 -0.1 0.3 -0.5 -0.6 -1.3 -0.6 -0.7 -0.9 -1.0 2.4 5.7 5.2 0.8 1.0 0.7 1.0 0.5
0.4 -1.2 -1.4 -0.9 -0.3 -0.1 -0.2 0.0 -1.7 -2.1 -1.1 -1.5 -2.1 -0.1 0.2 0.2 -0.4 3.8 6.1 1.4 3.9 3.2 5.4 6.1 0.4 -0.1 -0.2 -0.1 0.1 0.4
-0.1 -1.6 -1.6 -1.2 -1.0 -0.2 0.1 0.0 -0.6 -1.0 -0.8 -1.0 -0.3 -0.2 -0.1 0.6 1.1 0.9 3.2 3.2 2.6 3.3 1.6 0.0 1.0 1.1 -0.5 -0.6 -1.3 -0.9
0.2 -0.3 -0.9 -0.6 -0.6 -0.5 0.1 0.8 0.6 0.2 0.5 -0.2 0.1 0.7 1.3 2.1 1.6 2.5 3.0 2.4 3.1 1.7 3.7 4.2 0.3 0.5 0.9 0.6 0.4 -0.2
0.5 -0.5 -1.1 -0.5 -1.5 -1.3 -0.6 -0.2 -0.4 -0.1 -1.6 -0.3 -0.1 0.8 0.9 1.3 1.5 3.1 2.4 0.3 1.4 2.7 1.9 1.3 -0.1 1.2
2.2 -2.1 -1.7 -1.1 -1.2 -1.4 -0.5 0.2 0.9 2.1 3.5 0.0 -0.2 0.3 1.1 2.3 3.8 1.2 2.8 3.8 3.2 2.1 2.5 5.3 1.3 0.9 0.2 1.6
1.4 -1.7 -0.7 -0.6 -0.6 -1.4 -1.3 -0.5 0.2 0.1 1.3 -0.6 0.3 0.5 0.2 0.3 0.1 1.8 0.9 0.1 3.6 3.6 3.5 4.4 1.6 1.4 1.5 0.8 0.7 0.9
0.8 -0.2 2.0 1.2 0.9 0.4 0.7 0.5 0.5 0.3 0.9 -1.4 0.0 -0.5 -0.8 -0.9 -0.5 -0.1 -0.4 0.7 0.0 2.3 1.4 2.2 0.2 1.1 0.6 -0.2 -0.2 1.4 0.5 0.9
1.4 2.1 1.5 0.9 1.4 1.2 0.5 -0.3 -0.7 0.6 -0.2 -0.8 -0.4 -0.3 -0.7 -1.1 -2.1 0.8 0.0 -1.4 -1.4 -0.3 1.4 0.3

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 14
NOVEMBER 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT

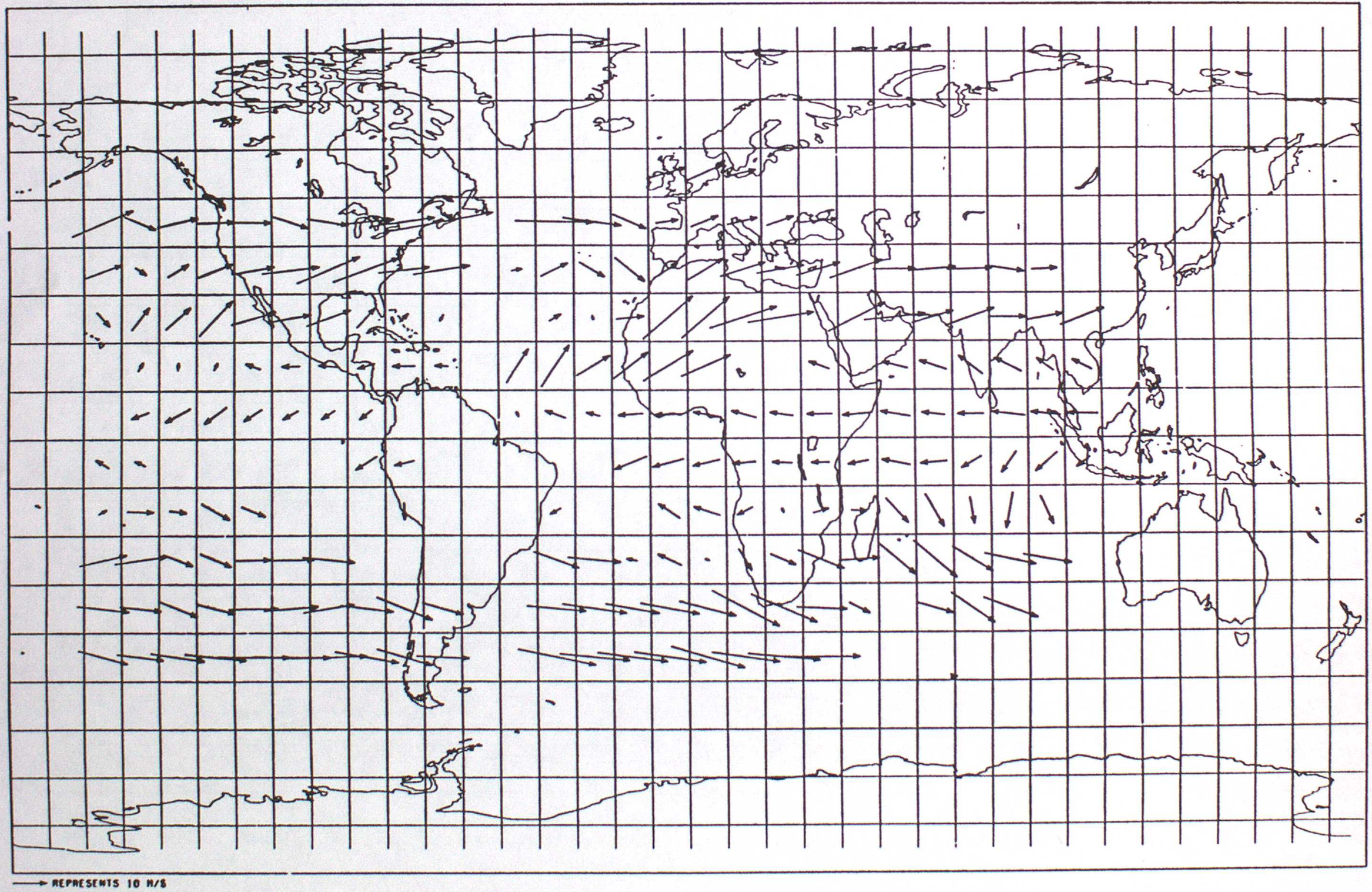

5 3
5 5 4 4 6 4 4 4 4 5 3 3 3 4
3 5 5 4 4 4 4 4 5 4 4 3 3 3 4 4 4 4 4 7 10 9 5 3 3 3
3 3 3 2 3 3 3 3 4 4 3 3 3 3 3 3 3 3 7 10 8 8 7 10 8 3 3 3 3 3 3
3 3 3 3 3 4 3 4 4 4 3 3 3 3 3 3 4 7 5 7 7 7 8 8 5 3 3 4 3 4 4
3 2 3 3 3 3 3 4 5 5 3 3 3 4 4 4 5 6 8 7 8 9 8 10 4 3 3 5 5 3
3 3 3 3 3 3 2 2 2 3 4 3 3 4 4 5 4 7 6 7 8 6 6 3 3 4 3
4 4 3 3 3 3 2 2 2 4 5 3 2 3 3 7 6 4 7 6 6 5 6 14 3 3 4 4
5 4 4 3 3 4 3 2 2 3 3 4 4 3 3 3 4 6 4 4 7 7 7 7 4 4 4 3 3 3
4 3 4 4 4 4 4 3 3 3 4 5 4 4 4 4 4 4 4 4 4 7 6 6 4 3 3 3 3 3 3 4 3 3
6 6 5 4 5 5 4 4 4 3 5 5 4 4 4 4 5 5 5 5 4 3 4 3

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 401 AND 700 HPA FIGURE 15
NOVEMBER 1993

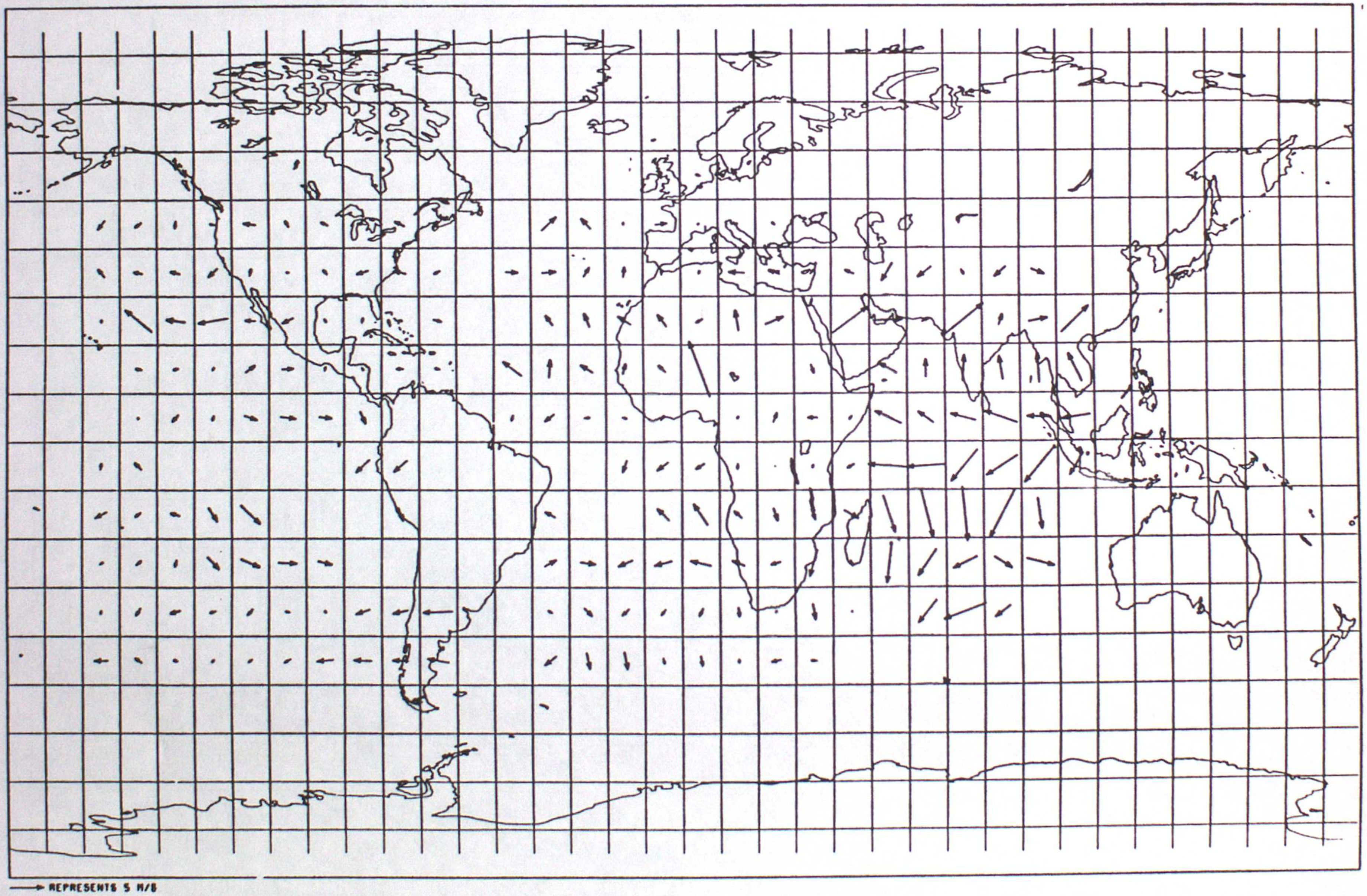

0 1 1 0
0 1 1 2 2 1 2 3 2 2 2 0 2 4 4 4 4 4 4
0 0 1 2 2 2 1 1 1 1 1 1 0 1 1 2 4 6 7 5 5 5 3 1 6 3 4 1
0 1 1 2 1 1 1 1 1 1 1 0 1 1 2 2 3 3 2 1 0 2 2 1 4 3 5 2
0 0 1 2 2 2 1 2 3 1 1 1 1 1 2 2 1 1 0 0 1 0 3 5 12 11 6 5
0 1 2 2 3 5 5 3 3 0 0 0 2 2 2 3 5 3 4 3 4 4 5 6 12 14 14 14
0 1 1 0 0 0 0 0 1 1 0 0 1 0 1 1 3 10 9 3 2 3 5 6 4 11 7 6
0 1 1 2 1 0 0 0 0 1 0 1 1 1 0 0 3 4 7 3 2 2 2 1 1 2 2 0
0 1 1 1 2 1 2 1 1 0 0 0 1 2 3 3 9 8 4 3 2 2 2 2 2 2 2 0
1 3 3 2 3 3 3 3 2 1 1 1 1 4 5 7 7 6 5 4 3 1 0 1 1 2 0
1 2 2 2 3 3 3 2 2 1 1 0 2 7 7 8 9 10 8 3
0 1

SATOB VECTOR MEAN WINDS BETWEEN 401-700 HPA
NOVEMBER 1993
ALL OBSERVATIONS
ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT

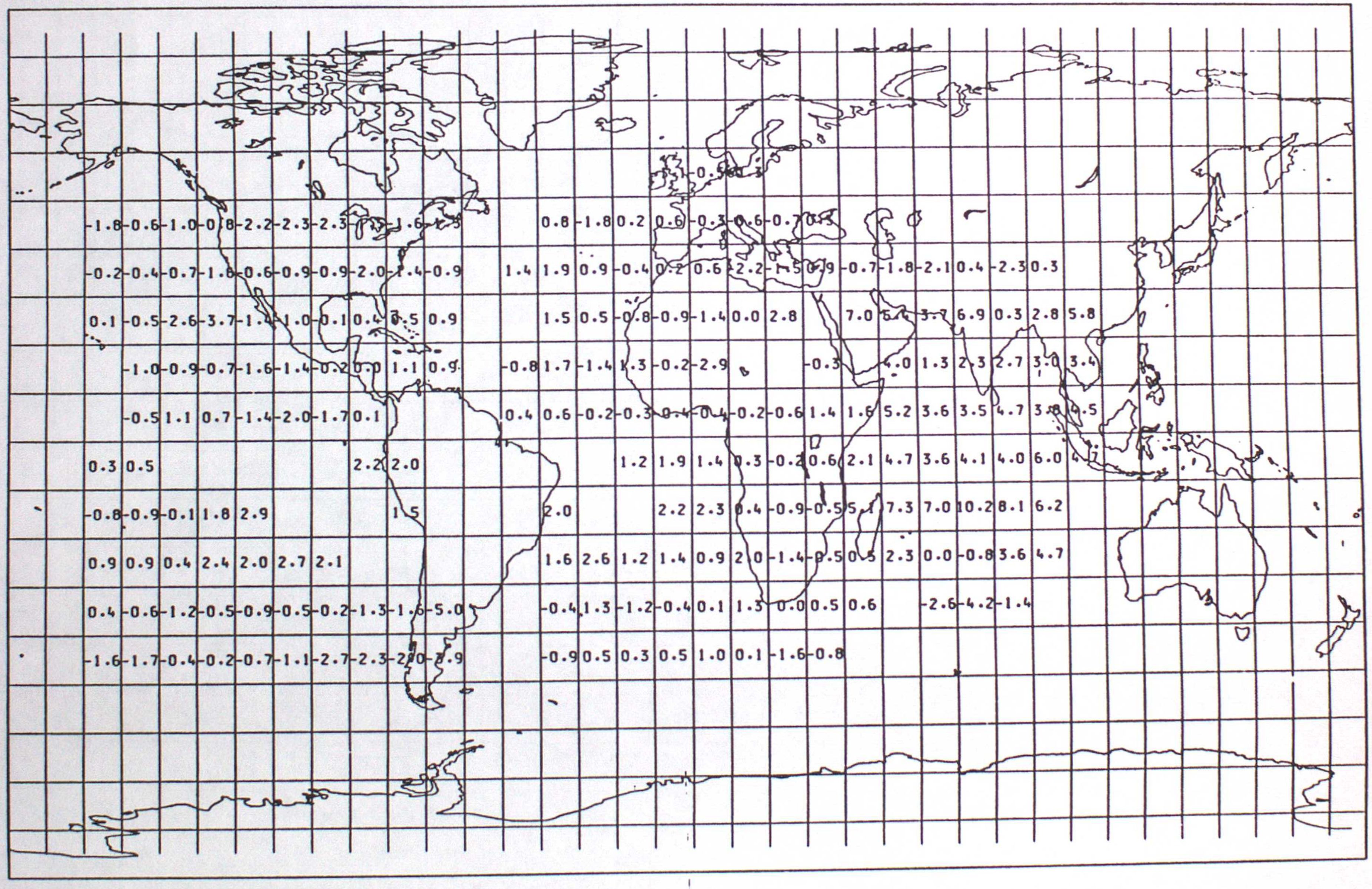
FIGURE 16


→ REPRESENTS 10 M/S

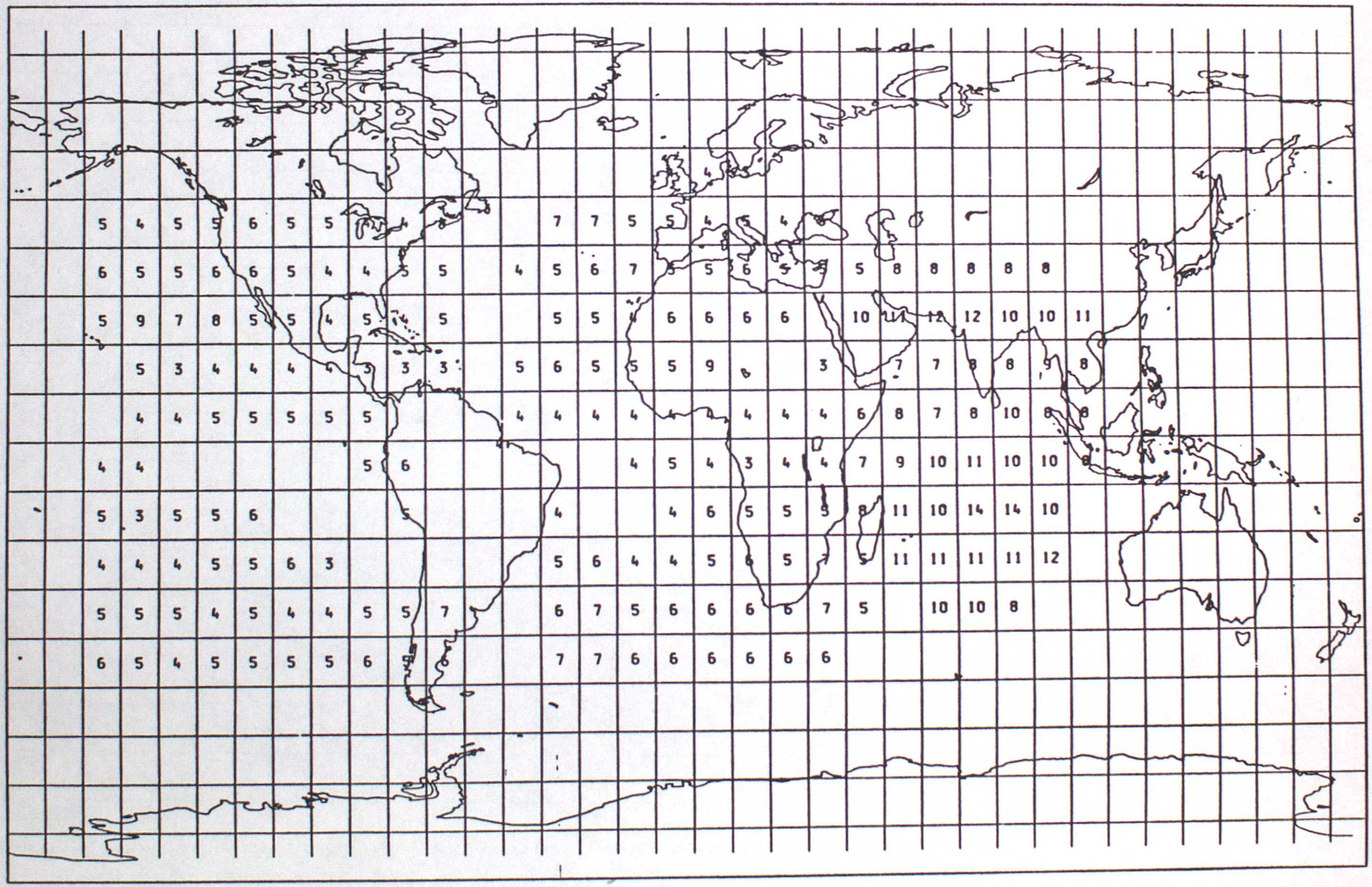
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 401-700 HPA FIGURE 17
NOVEMBER 1993
ALL OBSERVATIONS
ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT


REPRESENTS 5 M/S

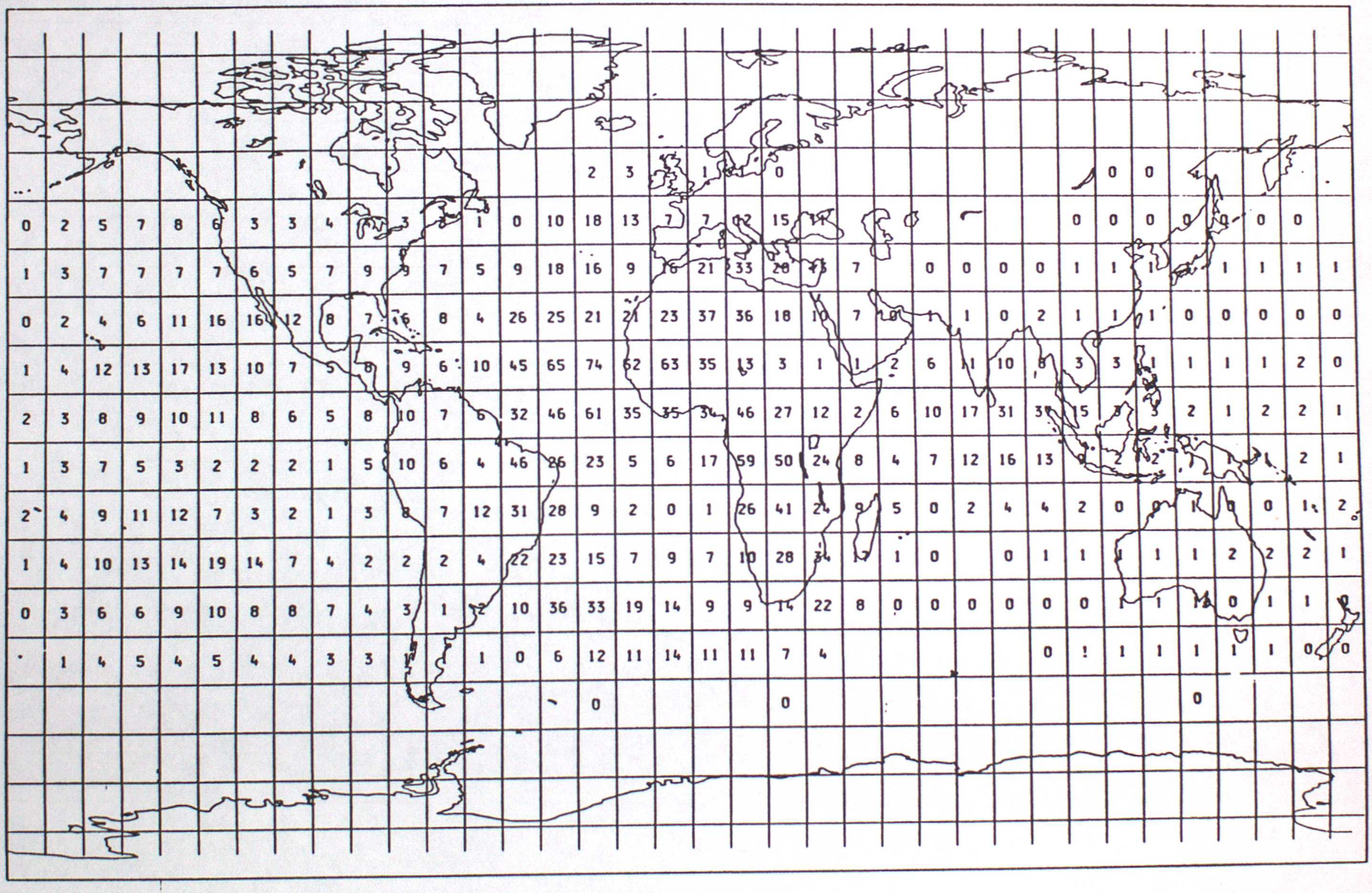
SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 18
NOVEMBER 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT


-0.5 0.3
-1.8 -0.6 -1.0 -0.8 -2.2 -2.3 -2.3 -1.6 -1.5 0.8 -1.8 0.2 0.6 -0.3 -0.6 -0.7 0.3
-0.2 -0.4 -0.7 -1.8 -0.6 -0.9 -0.9 -2.0 -1.4 -0.9 1.4 1.9 0.9 -0.4 0.2 0.6 -2.2 -1.5 0.9 -0.7 -1.8 -2.1 0.4 -2.3 0.3
0.1 -0.5 -2.6 -3.7 -1.4 -1.0 -0.1 0.4 0.5 0.9 1.5 0.5 -0.8 -0.9 -1.4 0.0 2.8 7.0 5.4 3.7 6.9 0.3 2.8 5.8
-1.0 -0.9 -0.7 -1.6 -1.4 -0.2 0.0 1.1 0.9 -0.8 1.7 -1.4 1.3 -0.2 -2.9 -0.3 4.0 1.3 2.3 2.7 3.0 3.4
-0.5 1.1 0.7 -1.4 -2.0 -1.7 0.1 0.4 0.6 -0.2 -0.3 -0.4 -0.4 -0.2 -0.6 1.4 1.6 5.2 3.6 3.5 4.7 3.8 4.5
0.3 0.5 2.2 2.0 1.2 1.9 1.4 0.3 -0.2 0.6 2.1 4.7 3.6 4.1 4.0 6.0 4.7
-0.8 -0.9 -0.1 1.8 2.9 1.5 2.0 2.2 2.3 0.4 -0.9 -0.5 5.1 7.3 7.0 10.2 8.1 6.2
0.9 0.9 0.4 2.4 2.0 2.7 2.1 1.6 2.6 1.2 1.4 0.9 2.0 -1.4 -0.5 0.5 2.3 0.0 -0.8 3.6 4.7
0.4 -0.6 -1.2 -0.5 -0.9 -0.5 -0.2 -1.3 -1.6 -5.0 -0.4 1.3 -1.2 -0.4 0.1 1.3 0.0 0.5 0.6 -2.6 -4.2 -1.4
-1.6 -1.7 -0.4 -0.2 -0.7 -1.1 -2.7 -2.3 -2.0 -3.9 -0.9 0.5 0.3 0.5 1.0 0.1 -1.6 -0.8

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 19
NOVEMBER 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT


4
5 4 5 5 6 5 5 4 8 7 7 5 5 4 5 4
6 5 5 6 6 5 4 4 5 5 4 5 6 7 5 5 6 5 5 5 8 8 8 8 8
5 9 7 8 5 5 4 5 4 5 5 5 4 6 6 6 6 10 11 12 12 10 10 11
5 3 4 4 4 4 3 3 3 5 6 5 5 5 9 6 3 7 7 8 8 9 8
4 4 5 5 5 5 5 4 4 4 4 4 4 4 4 4 6 8 7 8 10 8 8
4 4 5 6 4 5 4 3 4 4 7 9 10 11 10 10 8
5 3 5 5 6 5 4 4 6 5 5 5 8 11 10 14 14 10
4 4 4 5 5 6 3 5 6 4 4 5 6 5 7 5 11 11 11 11 12
5 5 5 4 5 4 4 5 5 7 6 7 5 6 6 6 6 7 5 10 10 8
6 5 4 5 5 5 5 6 5 6 7 7 6 6 6 6 6 6

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 101 AND 400 HPA FIGURE 20
NOVEMBER 1993


2 3 1 0 0 0
0 2 5 7 8 6 3 3 4 3 3 1 0 10 18 13 7 7 12 15 11 0 0 0 0 0 0 0
1 3 7 7 7 7 6 5 7 9 9 7 5 9 18 16 9 16 21 33 28 43 7 0 0 0 0 1 1 1 1 1 1 1
0 2 4 6 11 16 16 12 8 7 16 8 4 26 25 21 21 23 37 36 18 10 7 10 1 1 0 2 1 1 1 0 0 0 0 0
1 4 12 13 17 13 10 7 5 8 9 6 10 45 65 74 62 63 35 13 3 1 1 2 6 11 10 8 3 3 1 1 1 1 2 0
2 3 8 9 10 11 8 6 5 8 10 7 6 32 46 61 35 35 34 46 27 12 2 6 10 17 31 30 15 3 3 2 1 2 2 1
1 3 7 5 3 2 2 2 1 5 10 6 4 46 26 23 5 6 17 59 50 24 8 4 7 12 16 13 9 2 2 1 1 2 1
2 4 9 11 12 7 3 2 1 3 8 7 12 31 28 9 2 0 1 26 41 24 9 5 0 2 4 4 2 0 0 1 0 0 1 2
1 4 10 13 14 19 14 7 4 2 2 2 4 22 23 15 7 9 7 10 28 34 17 1 0 0 1 1 1 1 1 2 2 2 1
0 3 6 6 9 10 8 8 7 4 3 1 2 10 36 33 19 14 9 9 14 22 8 0 0 0 0 0 0 1 1 13 0 1 1 0
1 4 5 4 5 4 4 3 3 1 1 0 6 12 11 14 11 11 7 4 0 ! 1 1 1 1 1 0 0
0 0 0

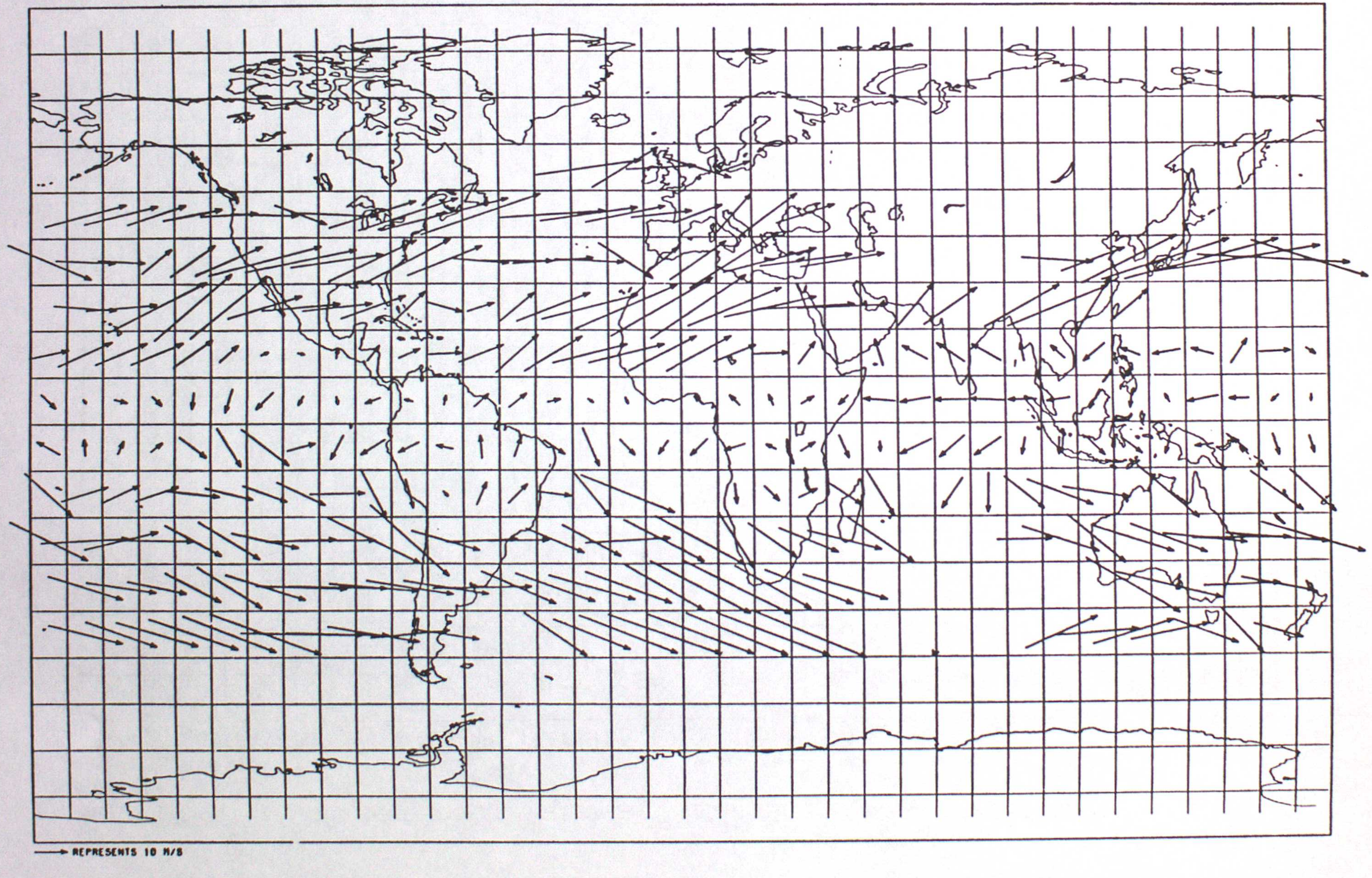
SATOB VECTOR MEAN WINDS BETWEEN 101-400 HPA

NOVEMBER 1993

ALL OBSERVATIONS

ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT

FIGURE 21


REPRESENTS 10 M/S

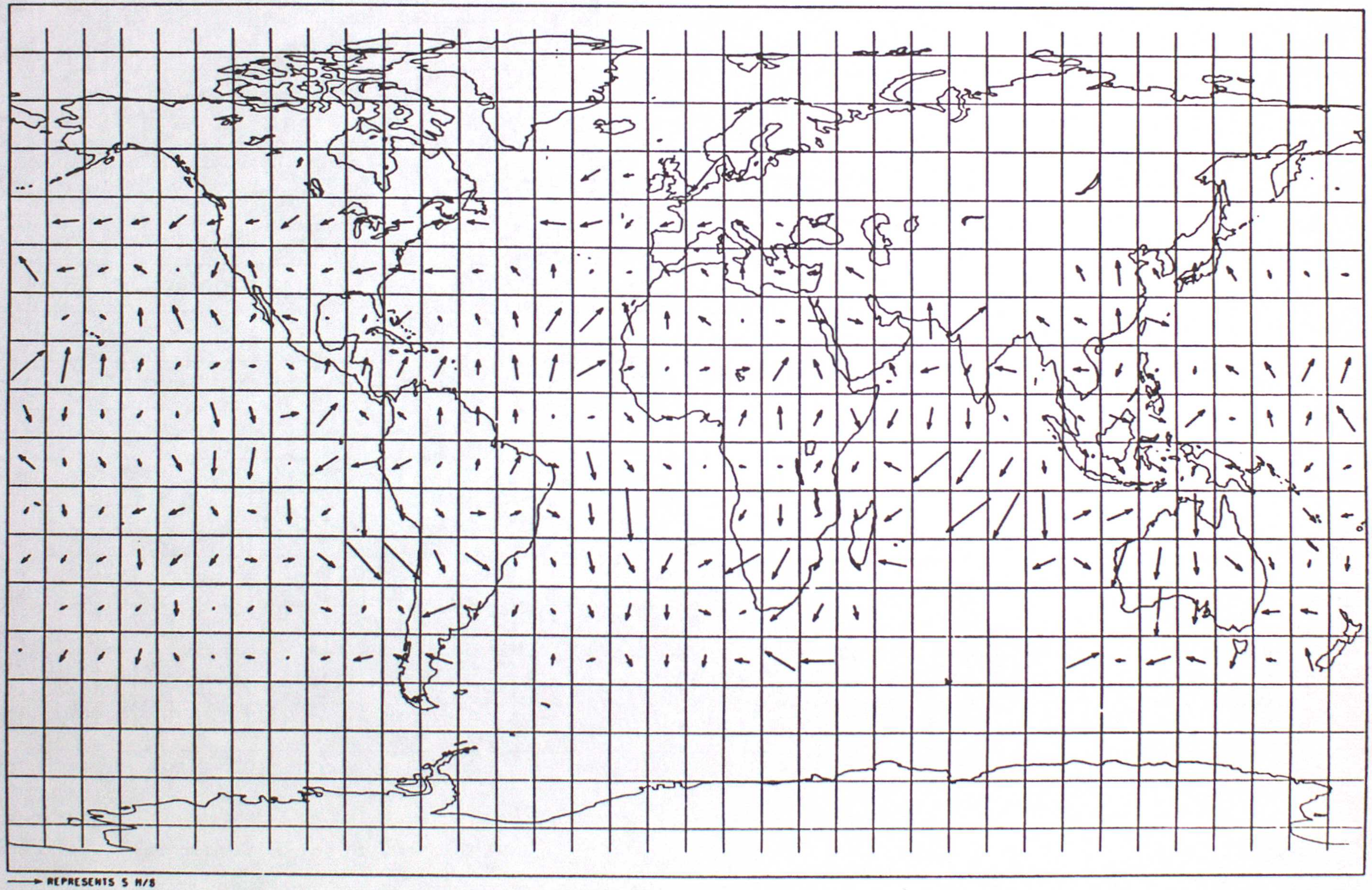
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 101-400 HPA

NOVEMBER 1993

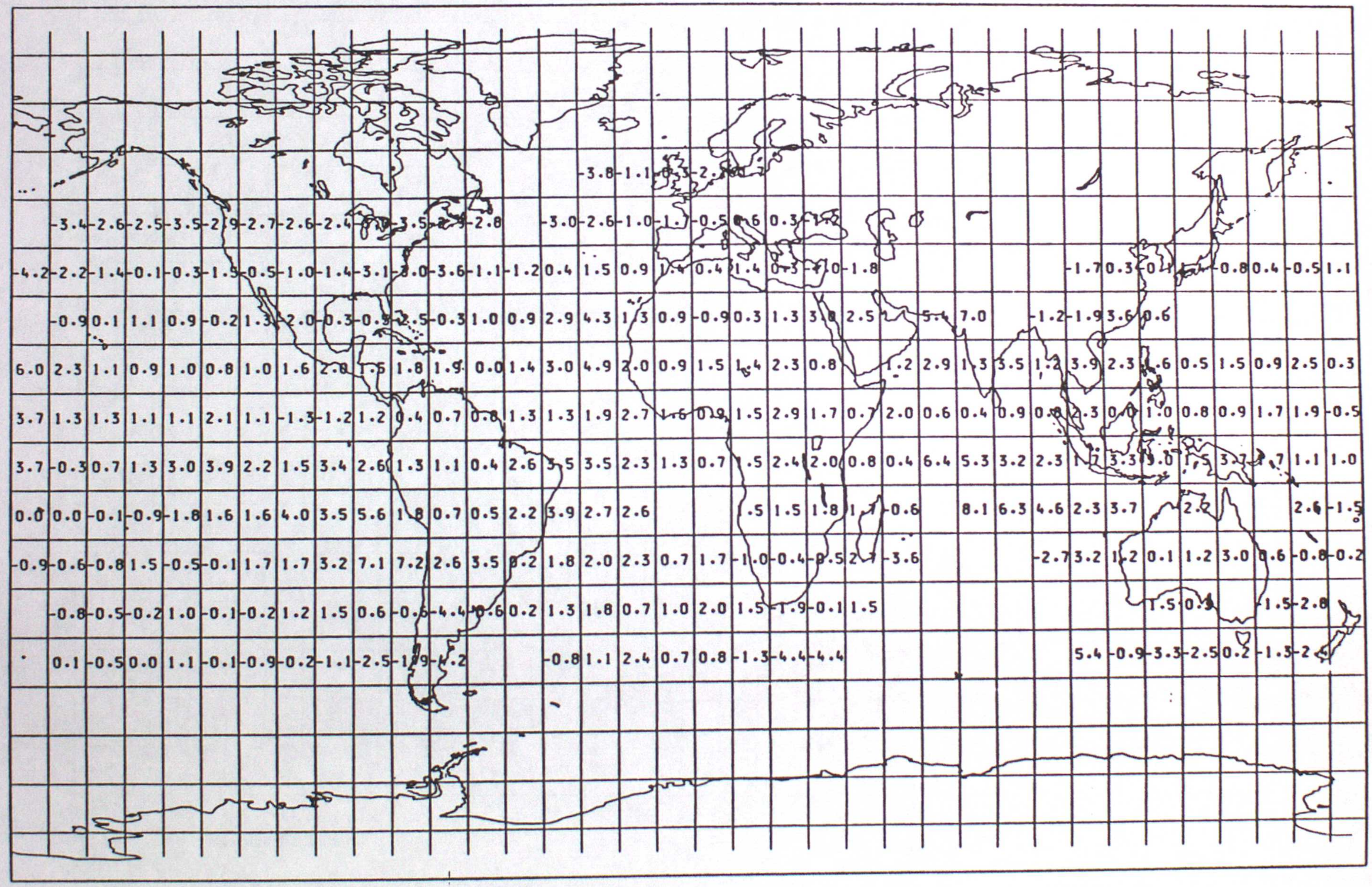
ALL OBSERVATIONS

ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT

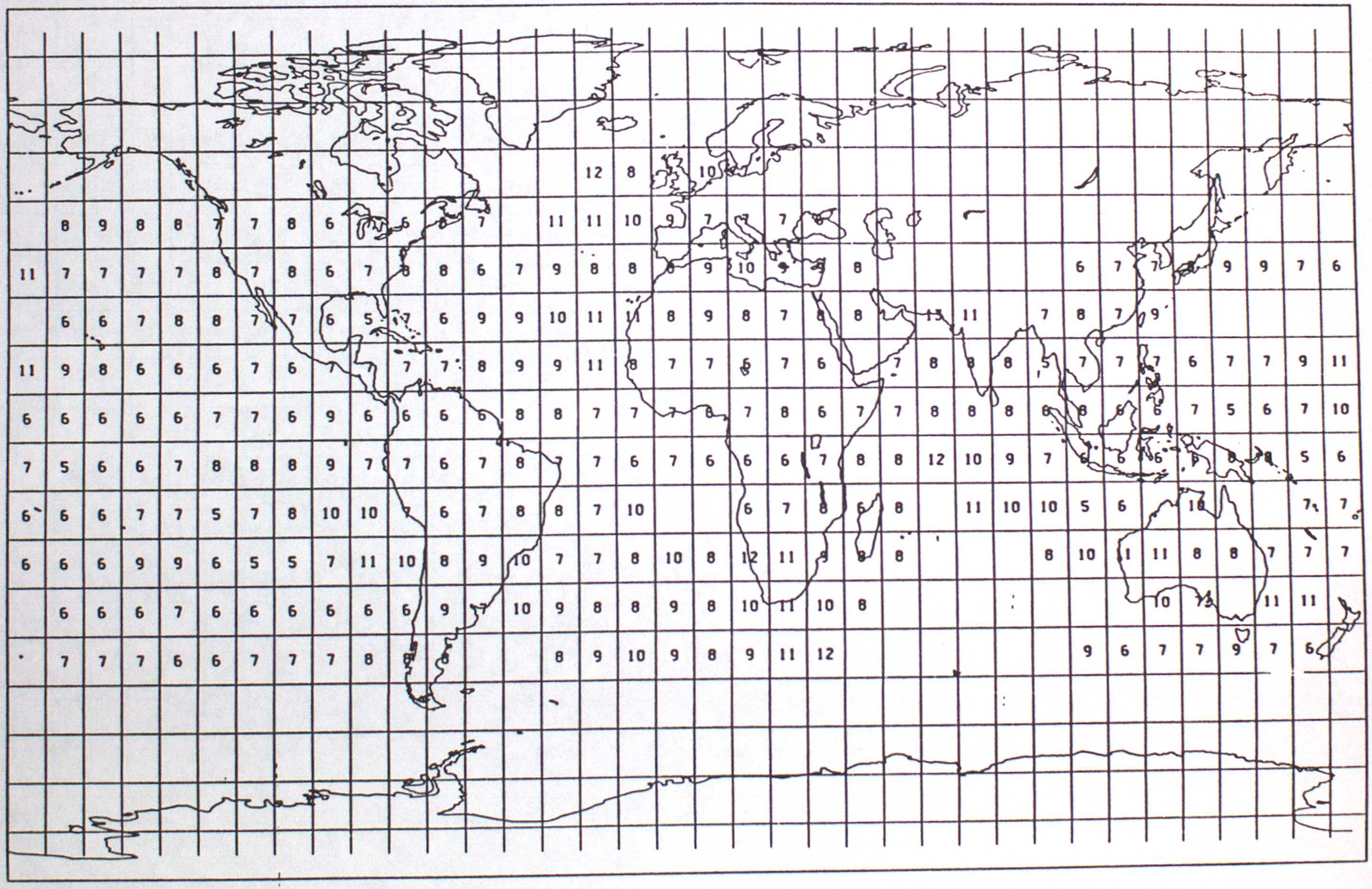
FIGURE 22


REPRESENTS 5 M/S

SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 23
NOVEMBER 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT


-3.8 -1.1 -0.3 -2.
-3.4 -2.6 -2.5 -3.5 -2.9 -2.7 -2.6 -2.4 -3.0 -3.5 -2.9 -2.8 -3.0 -2.6 -1.0 -1.7 -0.5 0.6 0.3 -1.2
-4.2 -2.2 -1.4 -0.1 -0.3 -1.5 -0.5 -1.0 -1.4 -3.1 -3.0 -3.6 -1.1 -1.2 0.4 1.5 0.9 1.4 0.4 1.4 0.3 -1.0 -1.8 -1.7 0.3 -0.1 -1.4 -0.8 0.4 -0.5 1.1
-0.9 0.1 1.1 0.9 -0.2 1.3 -2.0 -0.3 -0.3 -2.5 -0.3 1.0 0.9 2.9 4.3 1.3 0.9 -0.9 0.3 1.3 3.0 2.5 5.4 7.0 -1.2 -1.9 3.6 0.6
6.0 2.3 1.1 0.9 1.0 0.8 1.0 1.6 2.0 1.5 1.8 1.9 0.0 1.4 3.0 4.9 2.0 0.9 1.5 1.4 2.3 0.8 1.2 2.9 1.3 3.5 1.2 3.9 2.3 1.6 0.5 1.5 0.9 2.5 0.3
3.7 1.3 1.3 1.1 1.1 2.1 1.1 -1.3 -1.2 1.2 0.4 0.7 0.8 1.3 1.3 1.9 2.7 1.6 0.9 1.5 2.9 1.7 0.7 2.0 0.6 0.4 0.9 0.8 2.3 0.0 1.0 0.8 0.9 1.7 1.9 -0.5
3.7 -0.3 0.7 1.3 3.0 3.9 2.2 1.5 3.4 2.6 1.3 1.1 0.4 2.6 3.5 3.5 2.3 1.3 0.7 1.5 2.4 2.0 0.8 0.4 6.4 5.3 3.2 2.3 1.7 3.3 3.0 1.5 3.7 1.7 1.1 1.0
0.0 0.0 -0.1 -0.9 -1.8 1.6 1.6 4.0 3.5 5.6 1.8 0.7 0.5 2.2 3.9 2.7 2.6 1.5 1.5 1.8 1.7 -0.6 8.1 6.3 4.6 2.3 3.7 2.2 2.6 -1.5
-0.9 -0.6 -0.8 1.5 -0.5 -0.1 1.7 1.7 3.2 7.1 7.2 2.6 3.5 0.2 1.8 2.0 2.3 0.7 1.7 -1.0 -0.4 -0.5 2.7 -3.6 -2.7 3.2 1.2 0.1 1.2 3.0 0.6 -0.8 -0.2
-0.8 -0.5 -0.2 1.0 -0.1 -0.2 1.2 1.5 0.6 -0.6 -4.4 -0.6 0.2 1.3 1.8 0.7 1.0 2.0 1.5 -1.9 -0.1 1.5 1.5 0.3 -1.5 -2.8
0.1 -0.5 0.0 1.1 -0.1 -0.9 -0.2 -1.1 -2.5 -1.9 -4.2 -0.8 1.1 2.4 0.7 0.8 -1.3 -4.4 -4.4 5.4 -0.9 -3.3 -2.5 0.2 -1.3 -2.4

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 24
NOVEMBER 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT



MONITORING OF SATELLITE TEMPERATURES

MONITORING CENTRE: BRACKNELL

MONTH:November, 93

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from NOAA-11, NOAA-12 500 km.
Standard of comparison	:Background field from Bracknell global model.
Selection Criteria	:All SATEM soundings where number of observations > 30.
Data Extracted	:Layer: 850 - 1000 hPa 100 - 300 hPa 30 - 50 hPa
	:Mean observation minus background temperature differences

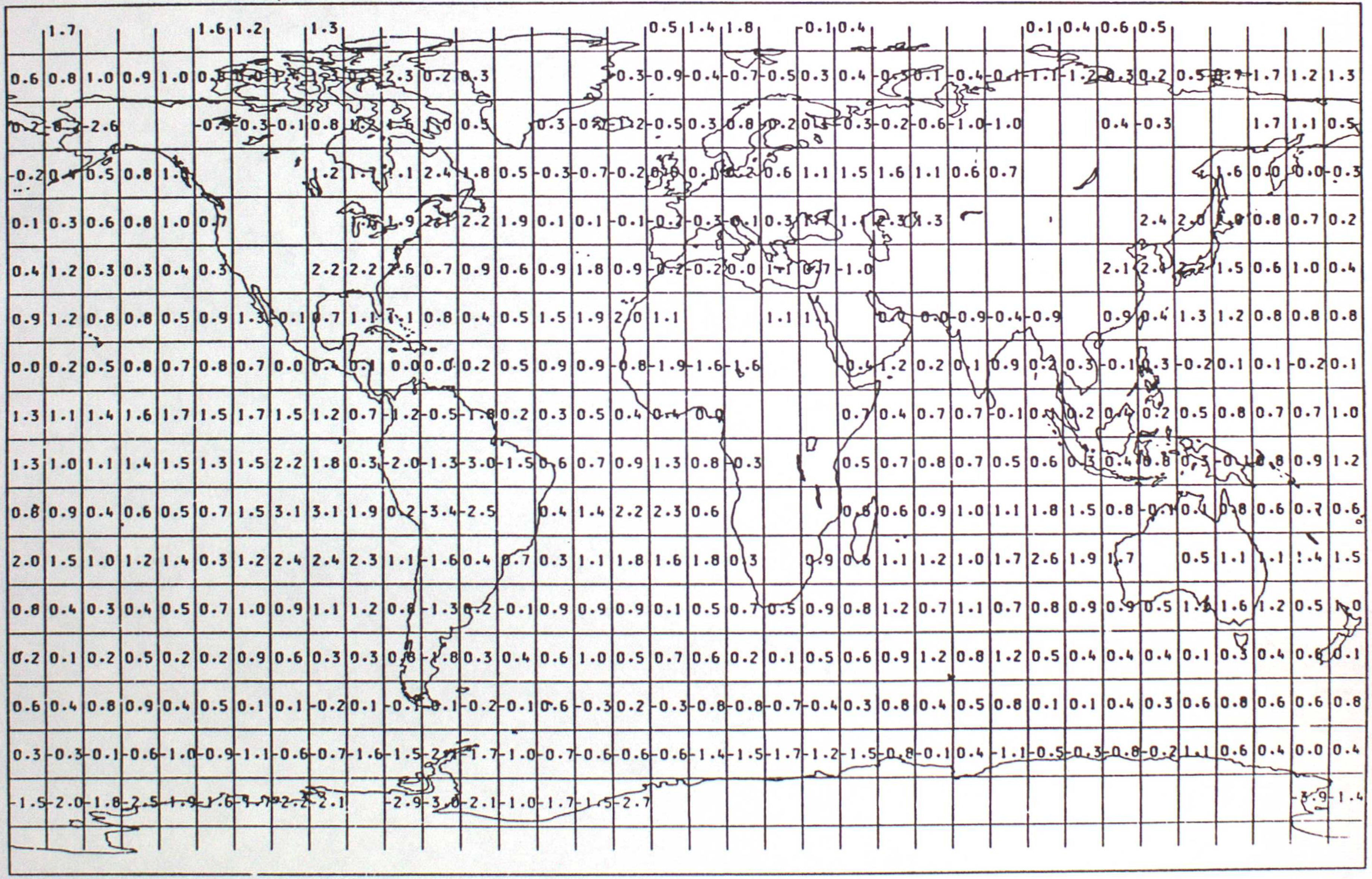
500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 850 TO 1000 HPA

NOVEMBER 1993

NOAA-11. USING ALL OBSERVATIONS

VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

FIGURE 25



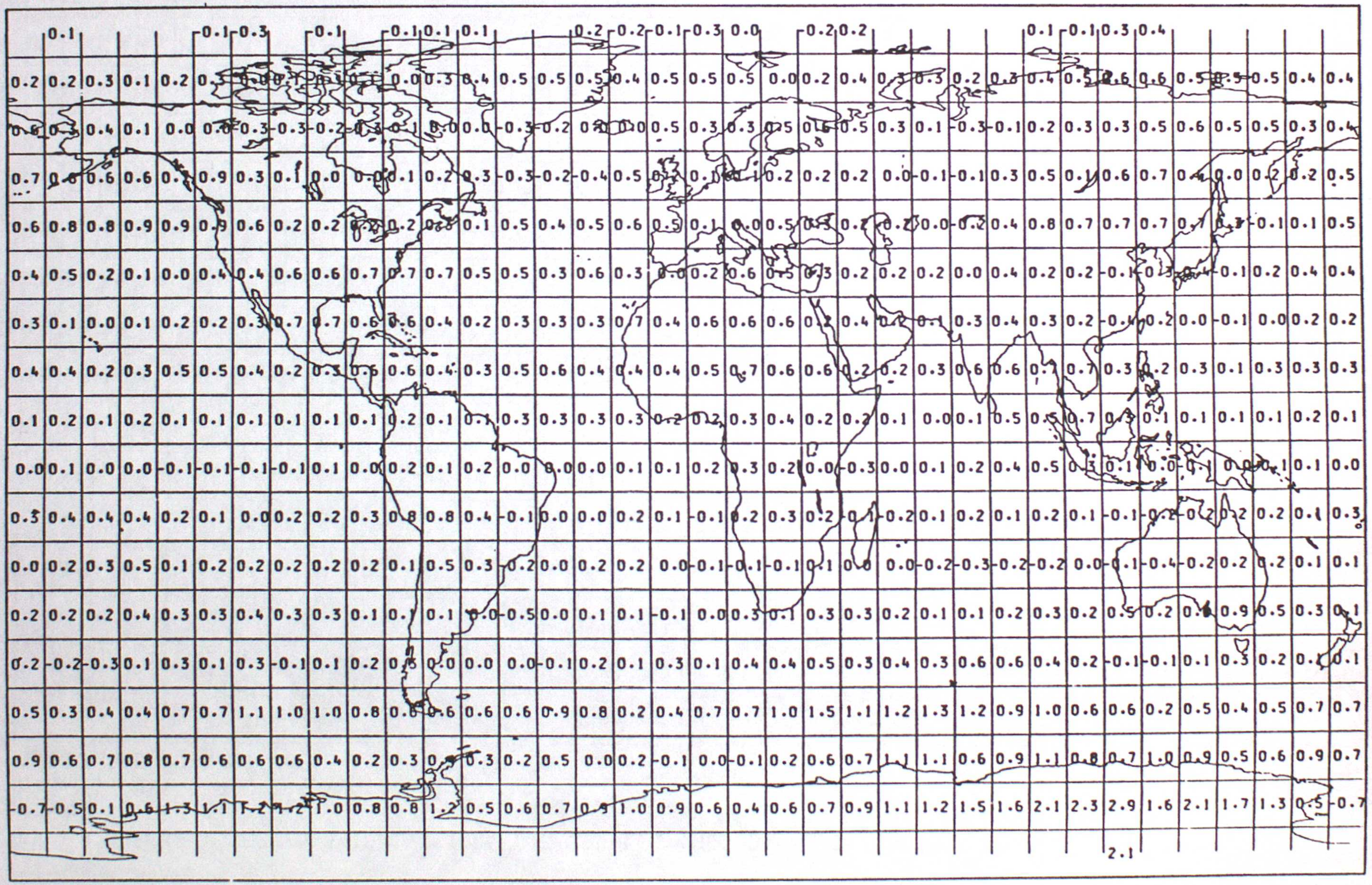
500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 100 TO 300 HPA

NOVEMBER 1993

NOAA-11. USING ALL OBSERVATIONS

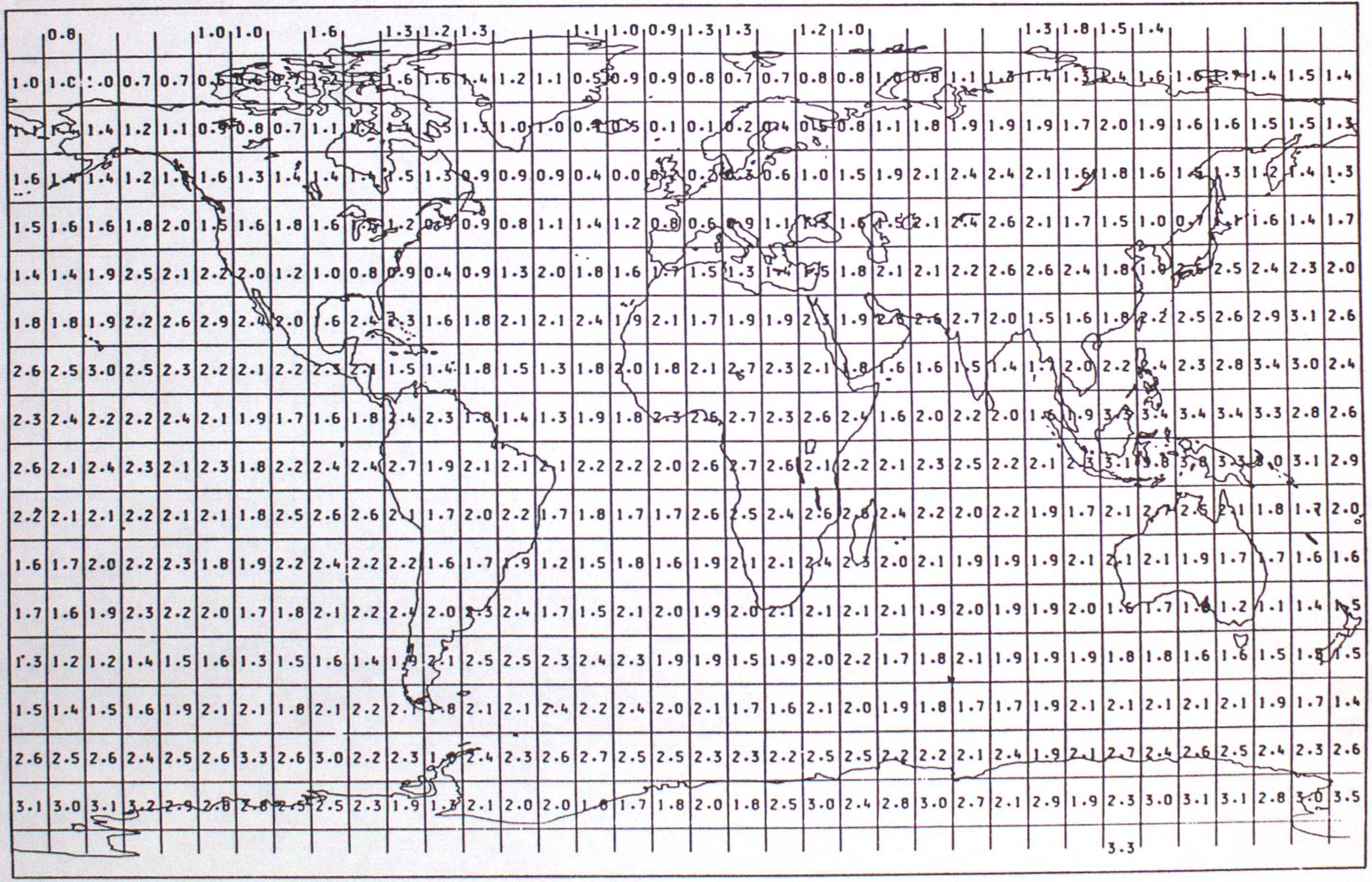
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

FIGURE 26


0.1 -0.1 -0.3 -0.1 -0.1 0.1 0.1 0.2 -0.2 -0.1 -0.3 0.0 -0.2 0.2 0.1 -0.1 0.3 0.4
0.2 0.2 0.3 0.1 0.2 0.3 0.0 0.1 0.1 0.1 0.0 0.3 0.4 0.5 0.5 0.5 0.4 0.5 0.5 0.5 0.0 0.2 0.4 0.3 0.3 0.2 0.3 0.4 0.5 0.6 0.6 0.5 0.5 0.5 0.4 0.4
0.6 0.3 0.4 0.1 0.0 0.0 -0.3 -0.3 -0.2 -0.3 -0.1 0.0 0.0 -0.3 -0.2 0.0 0.0 0.5 0.3 0.3 0.5 0.6 0.5 0.3 0.1 -0.3 -0.1 0.2 0.3 0.3 0.5 0.6 0.5 0.5 0.3 0.4
0.7 0.6 0.6 0.6 0.7 0.9 0.3 0.1 0.0 0.0 0.1 0.2 0.3 -0.3 -0.2 -0.4 0.5 0.1 0.1 0.1 0.2 0.2 0.2 0.0 -0.1 -0.1 0.3 0.5 0.1 0.6 0.7 0.4 0.0 0.2 0.2 0.5
0.6 0.8 0.8 0.9 0.9 0.9 0.6 0.2 0.2 0.2 0.2 0.3 0.1 0.5 0.4 0.5 0.6 0.5 0.1 0.0 0.5 0.3 0.2 -0.2 0.0 -0.2 0.4 0.8 0.7 0.7 0.7 0.7 0.3 -0.1 0.1 0.5
0.4 0.5 0.2 0.1 0.0 0.4 0.4 0.6 0.6 0.7 0.7 0.7 0.5 0.5 0.3 0.6 0.3 0.0 0.2 0.6 0.5 0.3 0.2 0.2 0.2 0.0 0.4 0.2 0.2 -0.1 -0.3 -0.4 -0.1 0.2 0.4 0.4
0.3 0.1 0.0 0.1 0.2 0.2 0.3 0.7 0.7 0.6 0.6 0.4 0.2 0.3 0.3 0.3 0.7 0.4 0.6 0.6 0.6 0.2 0.4 0.2 0.1 0.3 0.4 0.3 0.2 -0.4 -0.2 0.0 -0.1 0.0 0.2 0.2
0.4 0.4 0.2 0.3 0.5 0.5 0.4 0.2 0.3 0.6 0.6 0.4 0.3 0.5 0.6 0.4 0.4 0.4 0.5 0.7 0.6 0.6 0.2 0.2 0.3 0.6 0.6 0.7 0.7 0.3 0.2 0.3 0.1 0.3 0.3 0.3
0.1 0.2 0.1 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.2 0.1 0.1 0.3 0.3 0.3 0.3 0.2 0.2 0.3 0.4 0.2 0.2 0.1 0.0 0.1 0.5 0.5 0.7 0.3 0.1 0.1 0.1 0.1 0.2 0.1
0.0 0.1 0.0 0.0 -0.1 -0.1 -0.1 -0.1 0.1 0.0 0.2 0.1 0.2 0.0 0.0 0.0 0.1 0.1 0.2 0.3 0.2 0.0 -0.3 0.0 0.1 0.2 0.4 0.5 0.3 0.1 0.0 -0.1 0.0 0.1 0.1 0.0
0.3 0.4 0.4 0.4 0.2 0.1 0.0 0.2 0.2 0.3 0.8 0.8 0.4 -0.1 0.0 0.0 0.2 0.1 -0.1 0.2 0.3 0.2 -0.1 -0.2 0.1 0.2 0.1 0.2 0.1 -0.1 -0.2 -0.2 0.2 0.2 0.1 0.3
0.0 0.2 0.3 0.5 0.1 0.2 0.2 0.2 0.2 0.2 0.1 0.5 0.3 -0.2 0.0 0.2 0.2 0.0 -0.1 -0.1 -0.1 0.1 0.0 0.0 -0.2 -0.3 -0.2 -0.2 0.0 -0.1 -0.4 -0.2 0.2 0.2 0.1 0.1
0.2 0.2 0.2 0.4 0.3 0.3 0.4 0.3 0.3 0.1 0.1 0.1 0.0 -0.5 0.0 0.1 0.1 -0.1 0.0 0.3 0.1 0.3 0.3 0.2 0.1 0.1 0.2 0.3 0.2 0.5 0.2 0.4 0.9 0.5 0.3 0.1
0.2 -0.2 -0.3 0.1 0.3 0.1 0.3 -0.1 0.1 0.2 0.6 0.0 0.0 0.0 -0.1 0.2 0.1 0.3 0.1 0.4 0.4 0.5 0.3 0.4 0.3 0.6 0.6 0.4 0.2 -0.1 -0.1 0.1 0.3 0.2 0.1 0.1
0.5 0.3 0.4 0.4 0.7 0.7 1.1 1.0 1.0 0.8 0.6 0.6 0.6 0.6 0.9 0.8 0.2 0.4 0.7 0.7 1.0 1.5 1.1 1.2 1.3 1.2 0.9 1.0 0.6 0.6 0.2 0.5 0.4 0.5 0.7 0.7
0.9 0.6 0.7 0.8 0.7 0.6 0.6 0.6 0.4 0.2 0.3 0.3 0.3 0.2 0.5 0.0 0.2 -0.1 0.0 -0.1 0.2 0.6 0.7 1.1 1.1 0.6 0.9 1.1 0.8 0.7 1.0 0.9 0.5 0.6 0.9 0.7
-0.7 -0.5 0.1 0.6 1.3 1.1 1.2 1.2 1.0 0.8 0.8 1.2 0.5 0.6 0.7 0.9 1.0 0.9 0.6 0.4 0.6 0.7 0.9 1.1 1.2 1.5 1.6 2.1 2.3 2.9 1.6 2.1 1.7 1.3 0.5 -0.7
2.1

500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 30 TO 50 HPA
NOVEMBER 1993
NOAA-11. USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

FIGURE 27



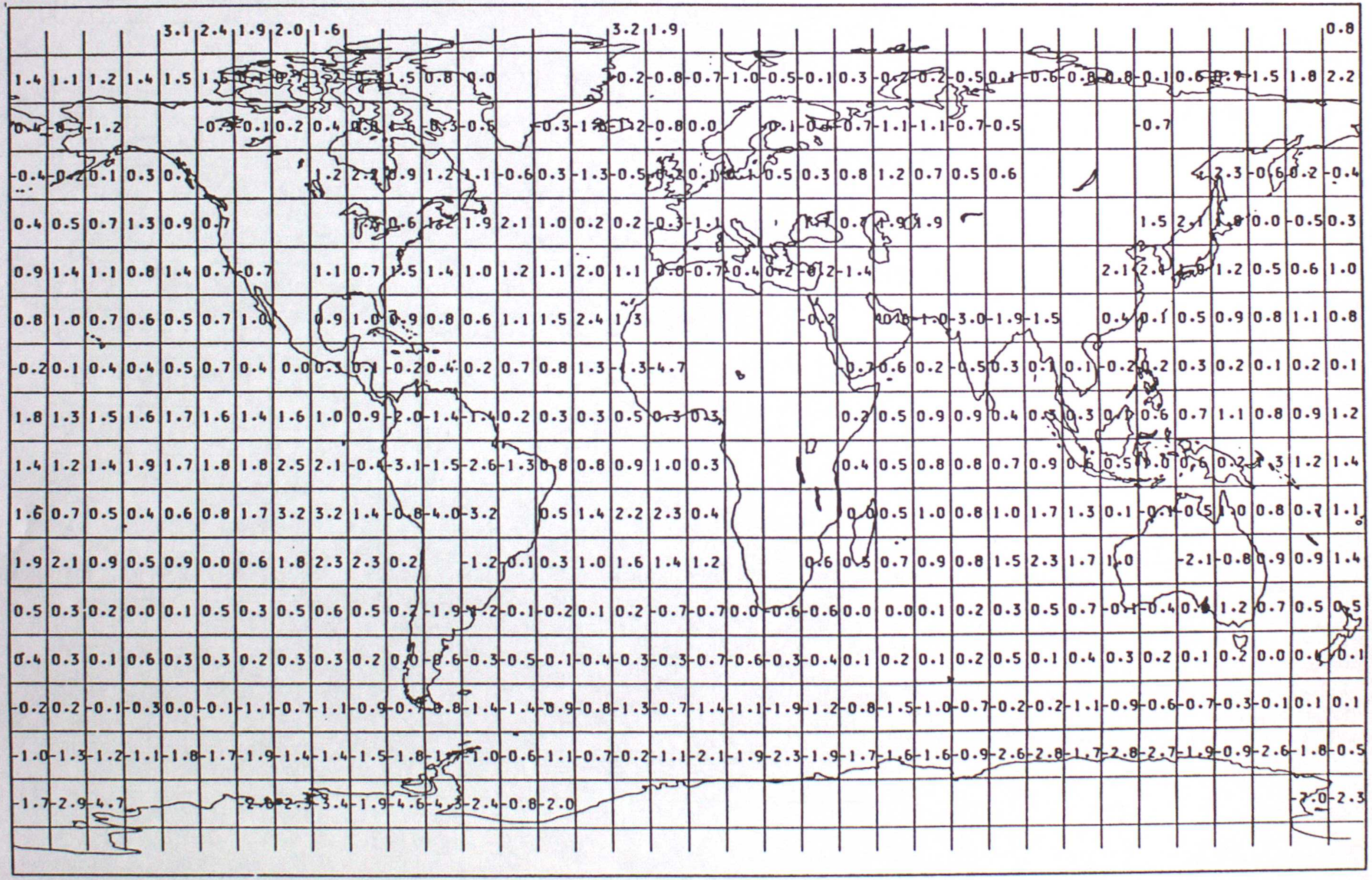
500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 850 TO 1000 HPA

NOVEMBER 1993

FIGURE 28

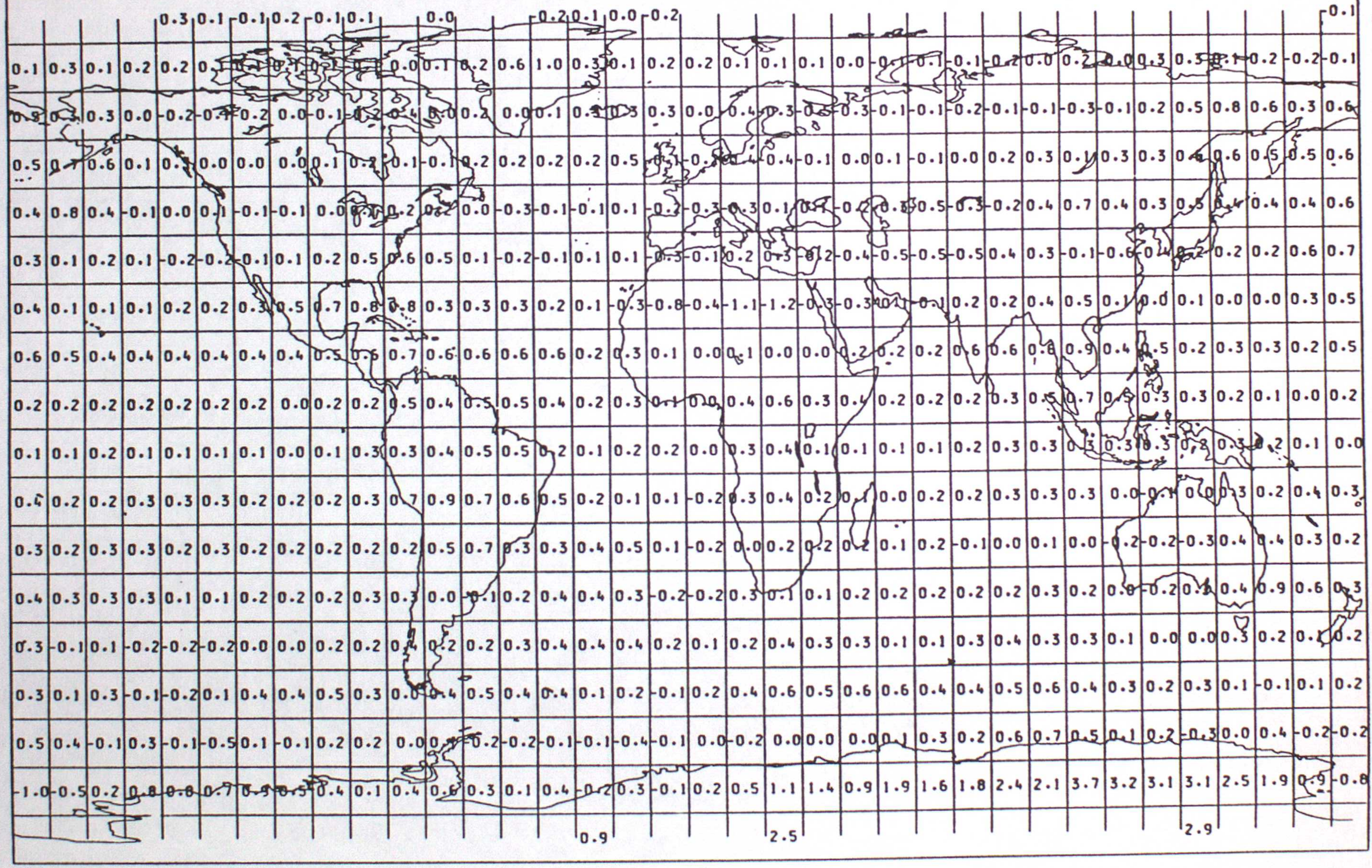
NOAA-12. USING ALL OBSERVATIONS

VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT


3.1 2.4 1.9 2.0 1.6 3.2 1.9 0.8
1.4 1.1 1.2 1.4 1.5 1.5 0.8 0.0 -0.2 -0.8 -0.7 -1.0 -0.5 -0.1 0.3 -0.2 -0.2 -0.5 -0.6 -0.8 -0.1 0.6 -1.5 1.8 2.2
-1.2 -0.3 -0.1 0.2 0.4 -0.3 -0.5 -0.3 -1.2 -0.8 0.0 -0.1 -0.7 -1.1 -1.1 -0.7 -0.5 -0.7
-0.4 -0.2 0.1 0.3 1.2 2.2 0.9 1.2 -1.1 -0.6 0.3 -1.3 -0.5 0.1 0.5 0.3 0.8 1.2 0.7 0.5 0.6 2.3 -0.6 0.2 -0.4
0.4 0.5 0.7 1.3 0.9 0.7 0.6 1.9 2.1 1.0 0.2 0.2 -0.3 -1.1 0.7 1.9 1.9 1.5 2.1 0.0 -0.5 0.3
0.9 1.4 1.1 0.8 1.4 0.7 -0.7 1.1 0.7 1.5 1.4 1.0 1.2 1.1 2.0 1.1 0.0 -0.7 0.4 -0.2 -1.4 2.1 2.4 1.2 0.5 0.6 1.0
0.8 1.0 0.7 0.6 0.5 0.7 1.0 0.9 1.0 0.9 0.8 0.6 1.1 1.5 2.4 1.3 -0.2 -1.0 -3.0 -1.9 -1.5 0.4 0.1 0.5 0.9 0.8 1.1 0.8
-0.2 0.1 0.4 0.4 0.5 0.7 0.4 0.0 0.3 0.1 -0.2 0.4 0.2 0.7 0.8 1.3 -4.3 -4.7 0.6 0.2 -0.5 0.3 0.1 0.1 -0.2 0.2 0.3 0.2 0.1 0.2 0.1
1.8 1.3 1.5 1.6 1.7 1.6 1.4 1.6 1.0 0.9 -2.0 -1.4 -1.4 0.2 0.3 0.3 0.5 -0.3 0.3 0.2 0.5 0.9 0.9 0.4 0.3 0.3 0.6 0.7 1.1 0.8 0.9 1.2
1.4 1.2 1.4 1.9 1.7 1.8 1.8 2.5 2.1 -0.4 -3.1 -1.5 -2.6 -1.3 0.8 0.8 0.9 1.0 0.3 0.4 0.5 0.8 0.8 0.7 0.9 0.6 0.5 0.6 0.2 1.3 1.2 1.4
1.6 0.7 0.5 0.4 0.6 0.8 1.7 3.2 3.2 1.4 -0.8 -4.0 -3.2 0.5 1.4 2.2 2.3 0.4 0.0 0.5 1.0 0.8 1.0 1.7 1.3 0.1 -0.1 0.5 1.0 0.8 0.7 1.1
1.9 2.1 0.9 0.5 0.9 0.0 0.6 1.8 2.3 2.3 0.2 -1.2 -0.1 0.3 1.0 1.6 1.4 1.2 0.6 0.5 0.7 0.9 0.8 1.5 2.3 1.7 1.0 -2.1 -0.8 0.9 0.9 1.4
0.5 0.3 0.2 0.0 0.1 0.5 0.3 0.5 0.6 0.5 0.2 -1.9 -1.2 -0.1 -0.2 0.1 0.2 -0.7 -0.7 0.0 -0.6 -0.6 0.0 0.0 0.1 0.2 0.3 0.5 0.7 -0.1 -0.4 0.8 1.2 0.7 0.5 0.5
0.4 0.3 0.1 0.6 0.3 0.3 0.2 0.3 0.3 0.2 0.0 -0.6 -0.3 -0.5 -0.1 -0.4 -0.3 -0.3 -0.7 -0.6 -0.3 -0.4 0.1 0.2 0.1 0.2 0.5 0.1 0.4 0.3 0.2 0.1 0.2 0.0 0.4 0.1
-0.2 0.2 -0.1 -0.3 0.0 -0.1 -1.1 -0.7 -1.1 -0.9 -0.7 -0.8 -1.4 -1.4 -0.9 -0.8 -1.3 -0.7 -1.4 -1.1 -1.9 -1.2 -0.8 -1.5 -1.0 -0.7 -0.2 -0.2 -1.1 -0.9 -0.6 -0.7 -0.3 -0.1 0.1 0.1
-1.0 -1.3 -1.2 -1.1 -1.8 -1.7 -1.9 -1.4 -1.4 -1.5 -1.8 -1.7 -1.0 -0.6 -1.1 -0.7 -0.2 -1.1 -2.1 -1.9 -2.3 -1.9 -1.7 -1.6 -1.6 -0.9 -2.6 -2.8 -1.7 -2.8 -2.7 -1.9 -0.9 -2.6 -1.8 -0.5
-1.7 -2.9 -4.7 -2.8 -2.3 -3.4 -1.9 -4.6 -4.3 -2.4 -0.8 -2.0 -2.0 -2.3

500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 100 TO 300 HPA
NOVEMBER 1993
NOAA-12. USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

FIGURE 29


0.3 0.1 -0.1 0.2 -0.1 0.1 0.0 -0.2 0.1 0.0 -0.2 -0.1
0.1 0.3 0.1 0.2 0.2 0.1 -0.1 -0.1 0.1 -0.1 0.0 0.1 0.2 0.6 1.0 0.3 0.1 0.2 0.2 0.1 0.1 0.1 0.0 -0.1 -0.1 -0.1 -0.2 0.0 0.2 0.0 0.3 0.3 0.1 -0.2 -0.2 -0.1
-0.3 0.3 0.3 0.0 -0.2 -0.4 -0.2 0.0 -0.1 -0.2 -0.4 0.0 0.2 0.0 0.1 0.3 0.3 0.3 0.0 -0.4 -0.3 -0.5 -0.3 -0.1 -0.1 -0.2 -0.1 -0.1 -0.3 -0.1 0.2 0.5 0.8 0.6 0.3 0.6
0.5 0.7 0.6 0.1 0.3 0.0 0.0 0.0 0.1 0.2 -0.1 -0.1 0.2 0.2 0.2 0.2 0.5 -0.1 -0.2 -0.4 -0.4 -0.1 0.0 0.1 -0.1 0.0 0.2 0.3 0.1 0.3 0.3 0.4 0.6 0.5 0.5 0.6
0.4 0.8 0.4 -0.1 0.0 0.1 -0.1 -0.1 0.0 0.1 0.2 0.2 0.0 -0.3 -0.1 -0.1 0.1 -0.2 -0.3 -0.3 0.1 0.1 -0.2 -0.3 -0.5 -0.3 -0.2 0.4 0.7 0.4 0.3 0.5 0.4 0.4 0.4 0.6
0.3 0.1 0.2 0.1 -0.2 -0.2 -0.1 0.1 0.2 0.5 0.6 0.5 0.1 -0.2 -0.1 0.1 0.1 -0.3 -0.1 0.2 0.3 0.2 -0.4 -0.5 -0.5 -0.5 0.4 0.3 -0.1 -0.6 0.4 0.2 0.2 0.2 0.6 0.7
0.4 0.1 0.1 0.1 0.2 0.2 0.3 0.5 0.7 0.8 0.8 0.3 0.3 0.3 0.2 0.1 -0.3 -0.8 -0.4 -1.1 -1.2 -0.3 -0.3 0.1 -0.1 0.2 0.2 0.4 0.5 0.1 0.0 0.1 0.0 0.0 0.3 0.5
0.6 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.6 0.7 0.6 0.6 0.6 0.6 0.2 0.3 0.1 0.0 0.1 0.0 0.0 0.2 0.2 0.2 0.6 0.6 0.8 0.9 0.4 0.5 0.2 0.3 0.3 0.2 0.5
0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.0 0.2 0.2 0.5 0.4 0.5 0.5 0.4 0.2 0.3 -0.1 0.0 0.4 0.6 0.3 0.4 0.2 0.2 0.2 0.3 0.5 0.7 0.5 0.3 0.3 0.2 0.1 0.0 0.2
0.1 0.1 0.2 0.1 0.1 0.1 0.1 0.0 0.1 0.3 0.3 0.4 0.5 0.5 0.2 0.1 0.2 0.2 0.0 0.3 0.4 0.1 0.1 0.1 0.1 0.2 0.3 0.3 0.3 0.3 0.3 0.2 0.3 0.2 0.1 0.0
0.4 0.2 0.2 0.3 0.3 0.3 0.2 0.2 0.2 0.3 0.7 0.9 0.7 0.6 0.5 0.2 0.1 0.1 -0.2 0.3 0.4 0.2 0.1 0.0 0.2 0.2 0.3 0.3 0.3 0.0 -0.1 0.0 0.3 0.2 0.4 0.3
0.3 0.2 0.3 0.3 0.2 0.3 0.2 0.2 0.2 0.2 0.2 0.5 0.7 0.3 0.3 0.4 0.5 0.1 -0.2 0.0 0.2 0.2 0.2 0.1 0.2 -0.1 0.0 0.1 0.0 -0.2 -0.2 -0.3 0.4 0.4 0.3 0.2
0.4 0.3 0.3 0.3 0.1 0.1 0.2 0.2 0.2 0.3 0.3 0.0 -0.1 0.2 0.4 0.4 0.3 -0.2 -0.2 0.3 0.1 0.1 0.2 0.2 0.2 0.2 0.2 0.3 0.2 0.0 -0.2 0.3 0.4 0.9 0.6 0.3
0.3 -0.1 0.1 -0.2 -0.2 -0.2 0.0 0.0 0.2 0.2 0.4 0.2 0.2 0.3 0.4 0.4 0.4 0.2 0.1 0.2 0.4 0.3 0.3 0.1 0.1 0.3 0.4 0.3 0.3 0.1 0.0 0.0 0.3 0.2 0.1 0.2
0.3 0.1 0.3 -0.1 -0.2 0.1 0.4 0.4 0.5 0.3 0.0 0.4 0.5 0.4 0.4 0.1 0.2 -0.1 0.2 0.4 0.6 0.5 0.6 0.6 0.4 0.4 0.5 0.6 0.4 0.3 0.2 0.3 0.1 -0.1 0.1 0.2
0.5 0.4 -0.1 0.3 -0.1 -0.5 0.1 -0.1 0.2 0.2 0.0 0.4 -0.2 -0.2 -0.1 -0.1 -0.4 -0.1 0.0 -0.2 0.0 0.0 0.0 0.1 0.3 0.2 0.6 0.7 0.5 0.1 0.2 -0.3 0.0 0.4 -0.2 -0.2
-1.0 -0.5 0.2 0.8 0.8 0.7 0.9 0.5 0.4 0.1 0.4 0.6 0.3 0.1 0.4 -0.2 0.3 -0.1 0.2 0.5 1.1 1.4 0.9 1.9 1.6 1.8 2.4 2.1 3.7 3.2 3.1 3.1 2.5 1.9 0.9 -0.8
0.9 2.5 2.9

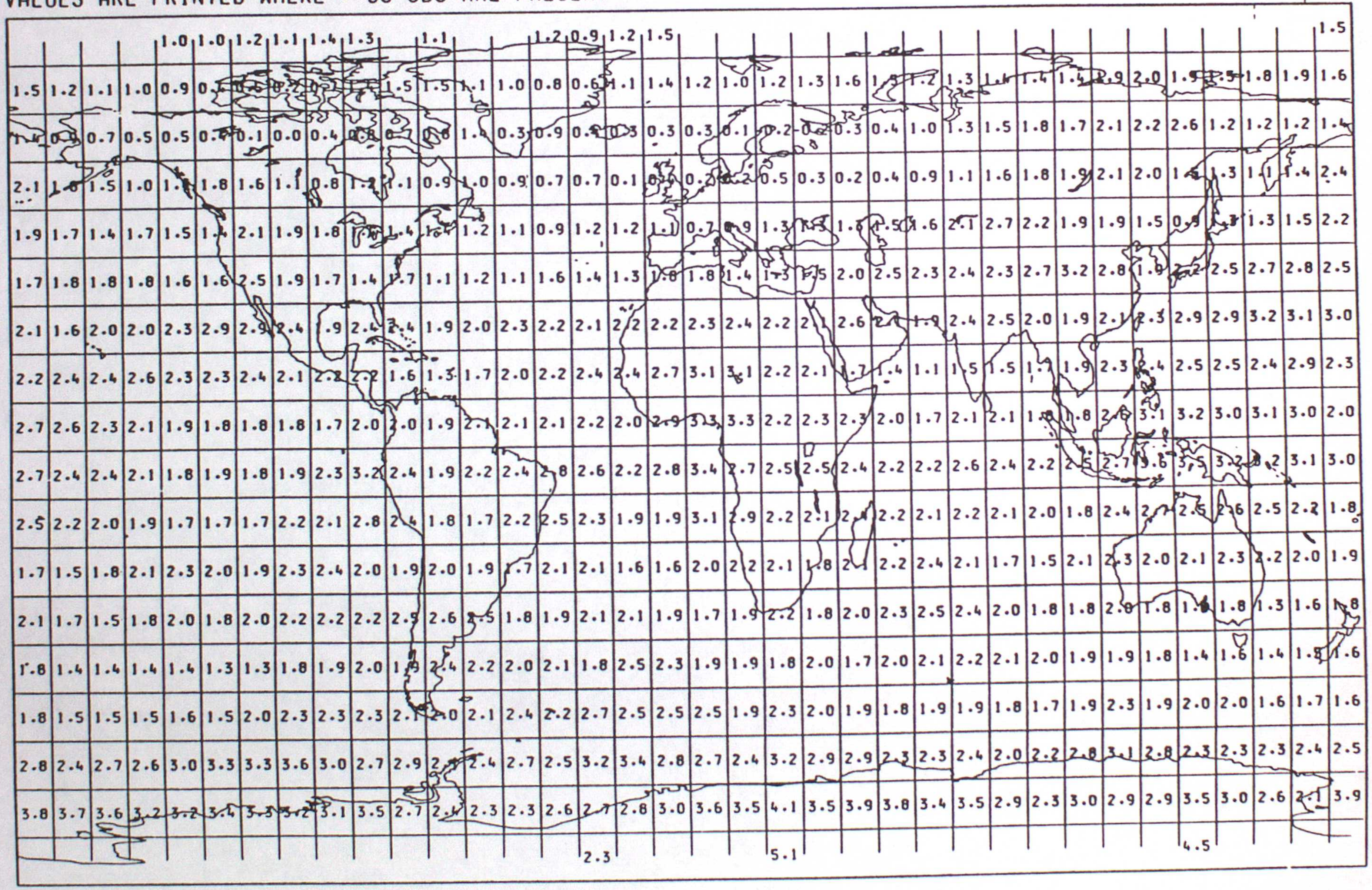
500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 30 TO 50 HPA

NOVEMBER 1993

NOAA-12. USING ALL OBSERVATIONS

VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

FIGURE 30


1.0 1.0 1.2 1.1 1.4 1.3 1.1 1.2 0.9 1.2 1.5 1.5
1.5 1.2 1.1 1.0 0.9 1.5 1.5 1.1 1.0 0.8 0.6 1.1 1.4 1.2 1.0 1.2 1.3 1.6 1.3 1.4 1.4 2.0 1.8 1.9 1.6
1.4 0.9 0.7 0.5 0.5 0.7 0.1 0.0 0.4 0.8 0.7 0.6 1.4 0.3 0.9 0.9 0.3 0.3 0.3 0.1 0.2 0.2 0.3 0.4 1.0 1.3 1.5 1.8 1.7 2.1 2.2 2.6 1.2 1.2 1.2 1.4
2.1 1.6 1.5 1.0 1.4 1.8 1.6 1.1 0.8 1.2 1.1 0.9 1.0 0.9 0.7 0.7 0.1 0.4 0.2 0.2 0.5 0.3 0.2 0.4 0.9 1.1 1.6 1.8 1.9 2.1 2.0 1.4 1.3 1.1 1.4 2.4
1.9 1.7 1.4 1.7 1.5 1.4 2.1 1.9 1.8 1.4 1.4 1.2 1.1 0.9 1.2 1.2 1.1 0.7 0.9 1.3 1.3 1.3 1.5 1.6 2.1 2.7 2.2 1.9 1.9 1.5 0.9 1.3 1.3 1.5 2.2
1.7 1.8 1.8 1.8 1.6 1.6 2.5 1.9 1.7 1.4 1.7 1.1 1.2 1.1 1.6 1.4 1.3 1.8 1.8 1.4 1.3 1.5 2.0 2.5 2.3 2.4 2.3 2.7 3.2 2.8 1.9 2.2 2.5 2.7 2.8 2.5
2.1 1.6 2.0 2.0 2.3 2.9 2.9 2.4 1.9 2.4 2.4 1.9 2.0 2.3 2.2 2.1 2.2 2.2 2.3 2.4 2.2 2.6 1.9 2.4 2.5 2.0 1.9 2.1 2.3 2.9 2.9 3.2 3.1 3.0
2.2 2.4 2.4 2.6 2.3 2.3 2.4 2.1 2.2 2.2 1.6 1.3 1.7 2.0 2.2 2.4 2.4 2.7 3.1 3.1 2.2 2.1 1.7 1.4 1.1 1.5 1.5 1.7 1.9 2.3 2.4 2.5 2.5 2.4 2.9 2.3
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1.7 1.5 1.8 2.1 2.3 2.0 1.9 2.3 2.4 2.0 1.9 2.0 1.9 1.7 2.1 2.1 1.6 1.6 2.0 2.1 1.8 2.2 2.4 2.1 1.7 1.5 2.1 2.3 2.0 2.1 2.3 2.2 2.0 1.9
2.1 1.7 1.5 1.8 2.0 1.8 2.0 2.2 2.2 2.2 2.5 2.6 2.5 1.8 1.9 2.1 2.1 1.9 1.7 1.9 2.2 1.8 2.0 2.3 2.5 2.4 2.0 1.8 1.8 2.0 1.8 1.8 1.8 1.3 1.6 1.8
1.8 1.4 1.4 1.4 1.4 1.3 1.3 1.8 1.9 2.0 1.9 2.4 2.2 2.0 2.1 1.8 2.5 2.3 1.9 1.9 1.8 2.0 1.7 2.0 2.1 2.2 2.1 2.0 1.9 1.9 1.8 1.4 1.6 1.4 1.8 1.6
1.8 1.5 1.5 1.5 1.6 1.5 2.0 2.3 2.3 2.3 2.1 2.0 2.1 2.4 2.2 2.7 2.5 2.5 2.5 1.9 2.3 2.0 1.9 1.8 1.9 1.9 1.8 1.7 1.9 2.3 1.9 2.0 2.0 1.6 1.7 1.6
2.8 2.4 2.7 2.6 3.0 3.3 3.3 3.6 3.0 2.7 2.9 2.4 2.4 2.7 2.5 3.2 3.4 2.8 2.7 2.4 3.2 2.9 2.9 2.3 2.3 2.4 2.0 2.2 2.8 3.1 2.8 2.3 2.3 2.3 2.4 2.5
3.8 3.7 3.6 3.2 3.2 3.4 3.3 3.2 3.1 3.5 2.7 2.4 2.3 2.3 2.6 2.7 2.8 3.0 3.6 3.5 4.1 3.5 3.9 3.8 3.4 3.5 2.9 2.3 3.0 2.9 2.9 3.5 3.0 2.6 2.1 3.9
2.3 5.1 4.5

APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Table 4 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 4 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Table 5 are:-

Level (hPa)	Windspeed m s^{-1}
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45